Programmed Math

A Sullivan Associates Program

California State Series

Book 6

Fractions

PROGRAMMED MATH

Marjorie Doyle Sullivan
Sullivan Associates

Book 6 • Fractions

This Is a California

STATE TEXTBOOK

- It is the duty of the pupils to assist the State by guarding and using this book with care, so that it may yield good service.
- If a pupil should lose or damage the book, he may be required to pay for the loss or damage.
- It is the duty of teachers to encourage and enforce these provisions.

Book No. _____

_____ *School District*

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Date of issue _____, 19____

NOTE TO THE INSTRUCTOR

Fractions is the sixth book of this series. If your students have not used Book 5, explain the use of the slider and give them the following instructions:

"Who can read what it says in the first gray box at the top of page 1? Who can read the sentence in the second gray box? Now look at the next box. Is this a circle or a square? In the sentence beside the circle you see two words on branched lines. Circle the word that correctly completes the sentence. (Pause.) Now pull your slider down to the first black line in the answer column. Did you all circle the right word?

"Who can read the question in the next box? Circle the answer to the question. (Pause.) Pull the slider down to the next black line and check. What is the correct answer?

"Look at the next box. How many parts is this circle divided into? Who can read the first sentence in the box? Who can read the question? Circle the answer and check. (Pause.) In the last sentence in the box you see a blank. Read the sentence and tell me what number you will put in the blank. Fill in the blank with the number 3 and check. Was 3 the right answer?

"Count the parts of the square in the next box. Then fill in the blank and check. (Pause.) Count the parts of the stick in the last box on the page. Fill in the blank and check."

Show the students how to slip the slider under the page to cover the answer column on page 2. Caution them that they must always cover the answers before they begin to work on a new page. Continue to help the students through the first six pages. At the end of Test 1, tell the students to score their own tests by marking the number of errors at the top of the page; a student gets 100 if he has made no mistakes. Help those who miss more than three answers. Start the others working independently as follows:

"Turn to page 7 and go on working by yourself. Don't forget to cover the answer column before you begin a new page. Wherever you see a blank, fill it in. Where you are given a choice, circle the correct answer."

If any student still doesn't seem to understand what to do, continue to help him through the book until he is ready to work by himself. For more complete instructions, see the accompanying teacher's manual.

A Sullivan Associates Program

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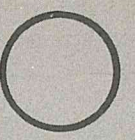
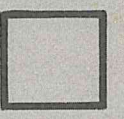


This is a circle.



This is a square.

circle

This is a circle. / square.

8

yes

Is this a square? yes / no

yes

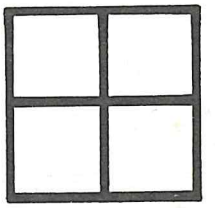
This circle has 3 parts.

Are all 3 parts the same size? yes / no

3

Therefore we say that the circle has ___ equal parts.

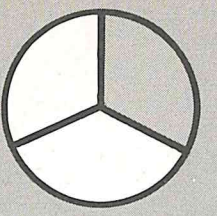
4



This square has ___ equal parts.

5

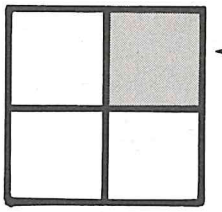
This stick has ___ equal parts.



← This is one of the three equal parts of this circle.

"one of three" ⟶ $\frac{1}{3}$

four



← This is one of the three / four equal parts of this square.

$\frac{1}{4}$

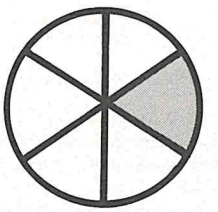
"one of four" ⟶ $\frac{}{4}$

This is one of the five equal parts of this stick.

$\frac{1}{5}$

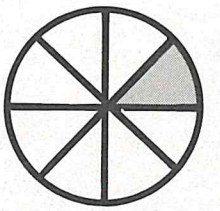
"one of five" ⟶ $\frac{1}{}$

$\frac{1}{6}$



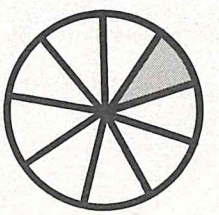
"one of six" ⟶ $\frac{1}{}$

$\frac{1}{8}$

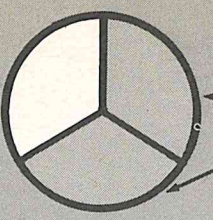


"one of eight" ⟶ $\frac{}{8}$

$\frac{1}{9}$

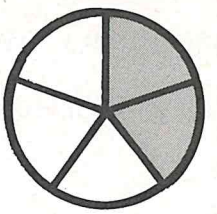
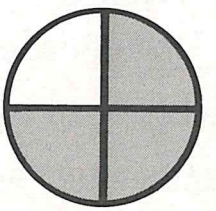
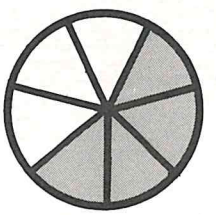
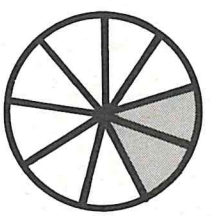
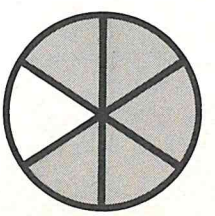


"one of nine" ⟶ $\frac{}{}$



Here are two of the three equal parts of this circle.

"two of three" ⟶ $\frac{2}{3}$

$\frac{2}{5}$		"two of five" ⟶ $\frac{2}{\quad}$
$\frac{3}{4}$		"three of four" ⟶ $\frac{\quad}{4}$
$\frac{4}{7}$		"four of seven" ⟶ $\frac{4}{\quad}$
$\frac{2}{9}$		"two of nine" ⟶ $\frac{\quad}{\quad}$
$\frac{5}{6}$		"five of six" ⟶ $\frac{\quad}{\quad}$

These are <u>whole numbers</u>:

1 2 5 9 14 376

These are <u>fractions</u>:

$\frac{1}{2}$ $\frac{3}{4}$ $\frac{7}{9}$ $\frac{16}{25}$ $\frac{584}{957}$

Circle the whole numbers:

(1) $\frac{1}{2}$ 2 $\frac{3}{4}$ 5 $\frac{7}{9}$ 14 $\frac{16}{25}$

2 5 14

Circle the fractions:

$\frac{2}{5}$ $\frac{9}{10}$ 7 136 $\frac{15}{37}$

$\frac{9}{10}$ $\frac{15}{37}$

$\frac{5}{8}$ ← The top part of a fraction is called the <u>numerator</u>.

Circle the numerators:

$\frac{3}{7}$ $\frac{5}{9}$ $\frac{4}{11}$ $\frac{27}{44}$

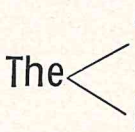
$\frac{5}{9}$ $\frac{4}{11}$ $\frac{27}{44}$

The bottom part of a fraction is called the <u>denominator</u>.

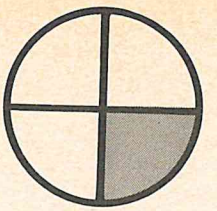
Circle the denominators:

$\frac{7}{8}$ $\frac{2}{3}$ $\frac{4}{5}$ $\frac{1}{20}$

$\frac{2}{3}$ $\frac{4}{5}$ $\frac{1}{20}$

fraction	A always has a numerator and a denominator.
$\frac{1}{8}$ $\frac{3}{4}$ $\frac{11}{17}$	Circle the fractions: 8 14 $\frac{1}{8}$ 29 $\frac{3}{4}$ $\frac{11}{17}$
36 4	Circle the whole numbers: $\frac{59}{84}$ $\frac{121}{817}$ 36 4 $\frac{6}{7}$
top	The  part of a fraction is called the numerator.
$\frac{(4)}{9}$ $\frac{(81)}{109}$ $\frac{(1)}{2}$	Circle the numerators: $\frac{4}{9}$ $\frac{81}{109}$ $\frac{1}{2}$
$\frac{5}{(6)}$ $\frac{21}{(100)}$ $\frac{4}{(19)}$	Circle the denominators: $\frac{5}{6}$ $\frac{21}{100}$ $\frac{4}{19}$

fraction	TEST $\frac{4}{7}$ is a fraction. / whole number.
yes	Is 316 a whole number? yes / no
23 150	Circle the whole numbers: 23 $\frac{4}{17}$ 150 $\frac{1}{8}$
$\frac{5}{8}$ $\frac{21}{39}$	Circle the fractions: $\frac{5}{8}$ 30 837 $\frac{21}{39}$
denominator	The bottom part of a fraction is called the numerator. / denominator.
$\frac{87}{(316)}$ $\frac{2}{(3)}$	Circle the denominators: $\frac{87}{316}$ $\frac{2}{3}$
$\frac{(7)}{12}$	Circle the numerator: $\frac{7}{12}$



$\frac{1}{4}$

The denominator of the fraction tells us how many parts this circle has.

4

This circle has 2 / 4 parts.

The numerator tells us how many of those parts we have shaded.

1

We have shaded 1 / 3 of the 4 parts.

$\frac{2}{5}$

denominator

The numerator / denominator tells us how many parts this circle has.

yes

Does the numerator tell us how many parts we have shaded? yes / no

5

We have shaded 2 of the ___ parts of this circle.

3

2

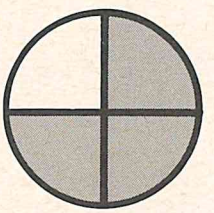
$\frac{2}{3}$

The denominator is 2. 3.

The numerator is ___.

3

4



$\frac{3}{4}$

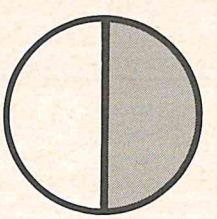
The numerator is 3. 4.

The denominator is ___.

$\frac{1}{2}$

$\frac{1}{6}$

Fill in the missing part of each fraction:

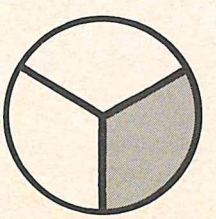


$\frac{1}{}$

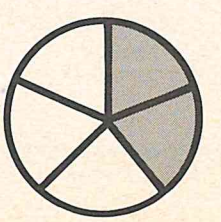
$\frac{}{6}$

$\frac{1}{3}$

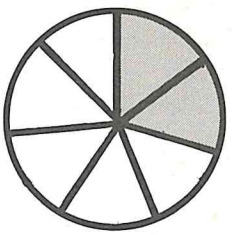
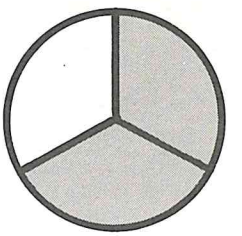
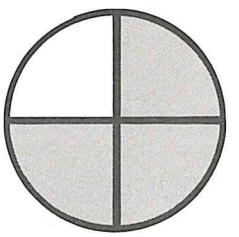
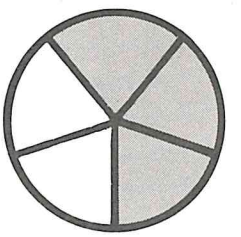
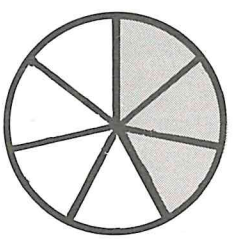
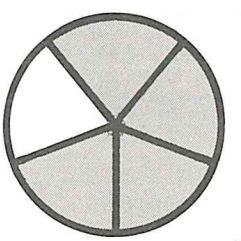
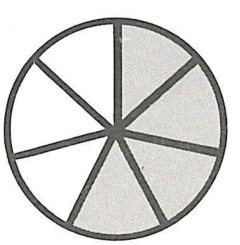
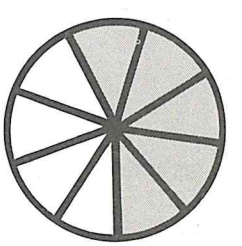
$\frac{2}{5}$

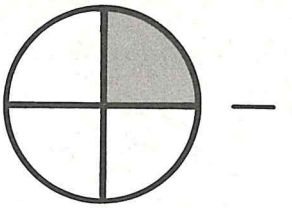
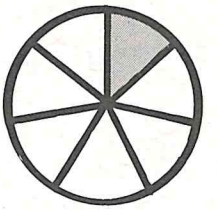
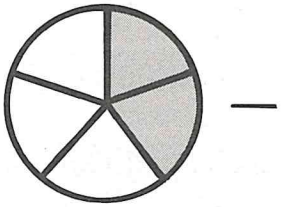
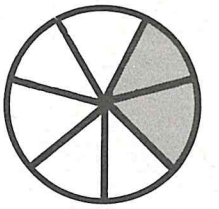
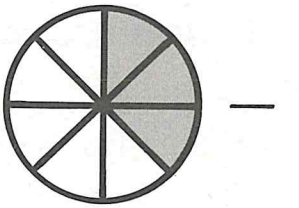
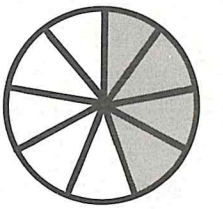
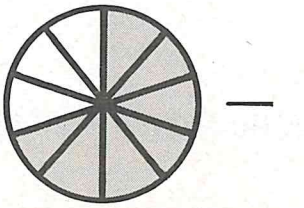
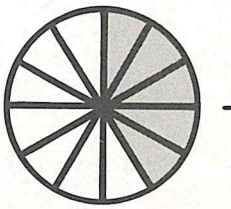


$\frac{}{3}$

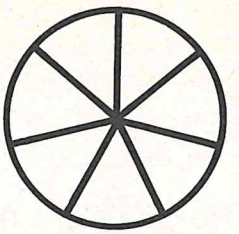


$\frac{2}{}$

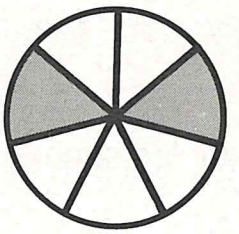
$\frac{2}{7}$	 $\frac{2}{\quad}$  $\frac{\quad}{3}$
$\frac{2}{3}$	
$\frac{3}{4}$	 $\frac{3}{\quad}$  $\frac{\quad}{5}$
$\frac{3}{5}$	
$\frac{3}{7}$	 $\frac{3}{\quad}$  $\frac{4}{\quad}$
$\frac{4}{5}$	
$\frac{4}{7}$	 $\frac{\quad}{7}$  $\frac{5}{\quad}$
$\frac{5}{9}$	

$\frac{1}{4}$	Write the fractions:
$\frac{1}{7}$	 —  —
$\frac{2}{5}$	
$\frac{2}{7}$	 —  —
$\frac{3}{8}$	
$\frac{4}{9}$	 —  —
$\frac{7}{10}$	
$\frac{5}{12}$	 —  —

Adding Fractions



What will our denominator be? ____
(How many parts does the circle have?)



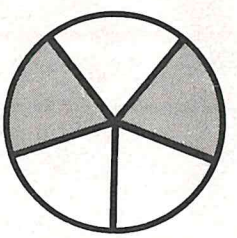
$$\frac{1}{7} + \frac{1}{7} = \frac{2}{7}$$

Did adding the fractions change the number of parts the circle has? yes / no

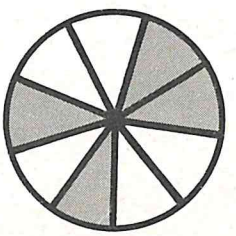
We added only the numerators.

The denominator stays the same. / changes.

Remember to add only the numerators:



$$\frac{1}{5} + \frac{1}{5} = \frac{\quad}{5}$$



$$\frac{1}{9} + \frac{1}{9} + \frac{2}{9} = \frac{\quad}{9}$$

7

no

stays the same

$\frac{2}{5}$

$\frac{4}{9}$

	TEST
$\frac{2}{11}$	$\frac{1}{11} + \frac{1}{11} = \frac{\quad}{11}$
$\frac{2}{15}$	$\frac{1}{15} + \frac{1}{15} = \frac{2}{\quad}$
$\frac{2}{19}$	$\frac{1}{19} + \frac{1}{19} = \frac{\quad}{19}$
$\frac{3}{4}$	$\frac{1}{4} + \frac{2}{4} = \frac{3}{\quad}$
$\frac{3}{7}$	$\frac{1}{7} + \frac{2}{7} = \frac{\quad}{7}$
$\frac{3}{8}$	$\frac{1}{8} + \frac{1}{8} + \frac{1}{8} = —$
$\frac{4}{5}$	$\frac{2}{5} + \frac{2}{5} = —$
$\frac{5}{7}$	$\frac{3}{7} + \frac{2}{7} = —$
$\frac{8}{9}$	$\frac{4}{9} + \frac{4}{9} = —$
$\frac{7}{11}$	$\frac{2}{11} + \frac{3}{11} + \frac{2}{11} = —$

$\frac{9}{16}$	$\frac{5}{16} + \frac{4}{16} = ___$
$\frac{12}{23}$	$\frac{6}{23} + \frac{6}{23} = ___$
$\frac{14}{15}$	$\frac{8}{15} + \frac{6}{15} = ___$
$\frac{16}{31}$	$\frac{9}{31} + \frac{7}{31} = ___$
$\frac{18}{19}$	$\frac{10}{19} + \frac{8}{19} = ___$
$\frac{17}{26}$	$\frac{7}{26} + \frac{5}{26} + \frac{5}{26} = ___$
$\frac{13}{18}$	$\frac{6}{18} + \frac{7}{18} = ___$
$\frac{19}{35}$	$\frac{12}{35} + \frac{7}{35} = ___$
$\frac{40}{67}$	$\frac{30}{67} + \frac{10}{67} = ___$
$\frac{20}{103}$	$\frac{14}{103} + \frac{6}{103} = ___$

Subtracting Fractions

$$\frac{4}{5} - \frac{1}{5} = \frac{3}{5}$$

Do we keep the same denominator? yes / no

yes

Remember to subtract only the numerators:

$\frac{1}{3}$	$\frac{2}{3} - \frac{1}{3} = \frac{\quad}{3}$
$\frac{1}{4}$	$\frac{3}{4} - \frac{2}{4} = \frac{\quad}{4}$
$\frac{2}{5}$	$\frac{4}{5} - \frac{2}{5} = \frac{\quad}{5}$
$\frac{3}{7}$	$\frac{5}{7} - \frac{2}{7} = \frac{\quad}{7}$
$\frac{2}{9}$	$\frac{7}{9} - \frac{5}{9} = \frac{\quad}{9}$
$\frac{1}{8}$	$\frac{5}{8} - \frac{4}{8} = \frac{\quad}{8}$
$\frac{1}{6}$	$\frac{4}{6} - \frac{3}{6} = \frac{\quad}{\quad}$
$\frac{3}{10}$	$\frac{9}{10} - \frac{6}{10} = \frac{\quad}{\quad}$

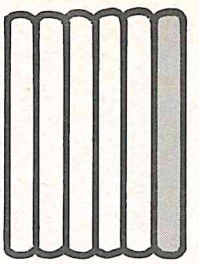
$\frac{3}{16}$	$\frac{9}{16} - \frac{6}{16} = __$
$\frac{7}{12}$	$\frac{11}{12} - \frac{4}{12} = __$
$\frac{4}{15}$	$\frac{7}{15} - \frac{3}{15} = __$
$\frac{14}{27}$	$\frac{19}{27} - \frac{5}{27} = __$
$\frac{5}{18}$	$\frac{8}{18} - \frac{3}{18} = __$
$\frac{1}{32}$	$\frac{11}{32} - \frac{10}{32} = __$
$\frac{7}{19}$	$\frac{14}{19} - \frac{7}{19} = __$
$\frac{16}{43}$	$\frac{26}{43} - \frac{10}{43} = __$
$\frac{41}{68}$	$\frac{47}{68} - \frac{6}{68} = __$
$\frac{3}{107}$	$\frac{23}{107} - \frac{20}{107} = __$

Multiplying Fractions

6

Here is a bundle of sticks.

How many sticks are there? ____



This stick is one of six.

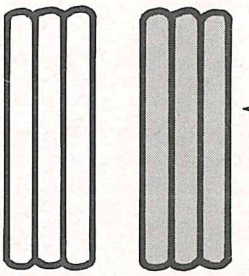
"one of six" ⟶ $\frac{1}{\quad}$

$\frac{1}{6}$

So this stick is $\frac{1}{6}$ of the whole bundle.

$\frac{1}{2}$

We split the bundle into two parts.



This part is one of two.

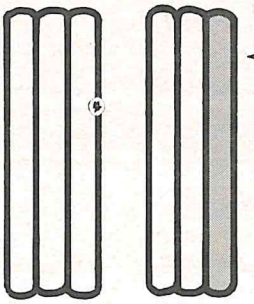
"one of two" ⟶ $\frac{1}{2}$

So this part is $\frac{1}{2}$ of the whole bundle.

3

How many sticks are there in $\frac{1}{2}$ of the bundle? ____

$\frac{1}{3}$



This stick is one of three sticks in $\frac{1}{2}$ of the bundle.

"one of three" ⟶ $\frac{1}{\quad}$

$\frac{1}{6}$

So this stick is $\frac{1}{3}$ of $\frac{1}{2}$ of the bundle.

It is also $\frac{\quad}{6}$ of the whole bundle.

$\frac{1}{2}$

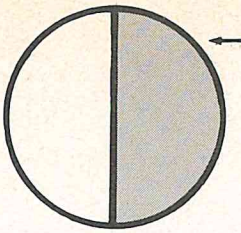
So $\frac{1}{3}$ of $\frac{1}{\quad}$ is the same as $\frac{1}{6}$.

$\frac{1}{6}$

Here is a short way to get the same answer.

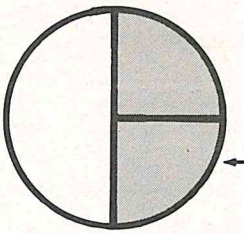
Multiply numerator × numerator and denominator × denominator $\quad \frac{1 \times 1}{3 \times 2} = \frac{\quad}{6}$

$\frac{1}{2}$



Here is one of two parts of a circle.

It is $\frac{1}{2}$ / $\frac{1}{3}$ of the circle.



Here is the same $\frac{1}{2}$ cut into two parts.

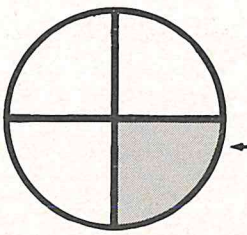
This is one of two parts of

$\frac{1}{2}$ of a circle.

$\frac{1}{2}$

It is $\frac{1}{2}$ of $\frac{1}{\quad}$.

$\frac{1}{4}$



Now the circle has four parts.

This is one of four parts.

It is $\frac{1}{\quad}$ of the whole circle.

yes

Is it also $\frac{1}{2}$ of $\frac{1}{2}$ of the circle? yes / no

$\frac{1}{2}$

So $\frac{1}{2}$ of $\frac{1}{\quad}$ is the same as $\frac{1}{4}$.

$\frac{1}{4}$

We could have multiplied

numerator × numerator and denominator × denominator $\quad \frac{1 \times 1}{2 \times 2} = \frac{1}{\quad}$

c.

We multiplied: (Check the correct answer.)

___ a. only the numerators.
___ b. only the denominators.
___ c. both the numerators and the denominators.

	TEST
$\frac{4}{5}$	$\frac{1}{5} + \frac{3}{5} = __$
$\frac{3}{11}$	$\frac{2}{11} + \frac{1}{11} = __$
$\frac{8}{9}$	$\frac{5}{9} + \frac{3}{9} = __$
$\frac{6}{17}$	$\frac{1}{17} + \frac{5}{17} = __$
$\frac{16}{25}$	$\frac{13}{25} + \frac{3}{25} = __$
$\frac{2}{7}$	$\frac{5}{7} - \frac{3}{7} = __$
$\frac{5}{9}$	$\frac{8}{9} - \frac{3}{9} = __$
$\frac{1}{6}$	$\frac{5}{6} - \frac{4}{6} = __$
$\frac{4}{13}$	$\frac{11}{13} - \frac{7}{13} = __$
$\frac{33}{74}$	$\frac{39}{74} - \frac{6}{74} = __$

$\frac{1}{2}$ of $\frac{1}{2}$ = $\frac{?}{?}$

We find the answer by multiplying:

$\frac{1}{4}$ $\quad \frac{1 \times 1}{2 \times 2} = \frac{\quad}{\quad}$

$\frac{1}{3}$ of $\frac{1}{3}$ = $\frac{?}{?}$

Multiply:

$\frac{1}{9}$ $\quad \frac{1 \times 1}{3 \times 3} = \frac{\quad}{\quad}$

We write only one multiplication sign:

$\frac{2}{3} \times \frac{1}{2}$ means $\frac{2 \times 1}{3 \times 2}$

Multiply

$\frac{2}{6}$ $\quad \frac{2}{3} \times \frac{1}{2} = \frac{\quad}{6}$

$\frac{3}{8}$ $\quad \frac{1}{2} \times \frac{3}{4} = \frac{3}{\quad}$

$\frac{3}{10}$ $\quad \frac{3}{5} \times \frac{1}{2} = \frac{\quad}{\quad}$

$\frac{2}{9}$ $\quad \frac{2}{3} \times \frac{1}{3} = \frac{\quad}{\quad}$

$\frac{1}{12}$	$\frac{1}{3} \times \frac{1}{4} = ___$
$\frac{1}{10}$	$\frac{1}{2} \times \frac{1}{5} = ___$
$\frac{3}{10}$	$\frac{3}{5} \times \frac{1}{2} = ___$
$\frac{1}{15}$	$\frac{1}{3} \times \frac{1}{5} = ___$
$\frac{2}{15}$	$\frac{1}{5} \times \frac{2}{3} = ___$
$\frac{1}{12}$	$\frac{1}{2} \times \frac{1}{6} = ___$
$\frac{4}{15}$	$\frac{1}{3} \times \frac{4}{5} = ___$
$\frac{5}{12}$	$\frac{5}{6} \times \frac{1}{2} = ___$
$\frac{1}{18}$	$\frac{1}{3} \times \frac{1}{6} = ___$
$\frac{3}{20}$	$\frac{1}{5} \times \frac{3}{4} = ___$

smaller	$\frac{3}{5}$ is a proper fraction. Its numerator is larger / smaller than its denominator.
yes	$\frac{9}{2}$ is an improper fraction. Is its numerator larger than its denominator? yes / no
$\frac{7}{4}$ $\frac{12}{5}$ $\frac{8}{3}$	Circle the improper fractions: $\frac{3}{2}$ $\frac{1}{8}$ $\frac{7}{4}$ $\frac{12}{5}$ $\frac{3}{14}$ $\frac{11}{19}$ $\frac{8}{3}$
proper	The numbers you did not circle are called proper / improper fractions.
$\frac{7}{3}$	To invert a fraction is to turn it over. $\frac{2}{5}$ inverted is $\frac{5}{2}$ $\frac{3}{7}$ inverted is $\frac{7}{}$
$\frac{4}{9}$	$\frac{9}{4}$ inverted is $\frac{}{9}$
$\frac{3}{2}$	$\frac{2}{3}$ inverted is —
$\frac{6}{11}$	$\frac{11}{6}$ inverted is —

Invert these fractions:

$\frac{5}{8}$ $\frac{12}{7}$ $\frac{6}{19}$

$\frac{8}{5}$ $\frac{7}{12}$ $\frac{19}{6}$

If we invert the improper fraction $\frac{5}{1}$, we get the proper fraction —.

$\frac{1}{5}$

Any whole number can be thought of as an improper fraction with a denominator of 1.

$7 \longrightarrow \frac{7}{1}$

$2 \longrightarrow \frac{2}{1}$

$6 \longrightarrow \frac{}{1}$

$\frac{6}{1}$

$4 \longrightarrow$ —

$\frac{4}{1}$

$17 \longrightarrow$ —

$\frac{17}{1}$

$65 \longrightarrow$ —

$\frac{65}{1}$

The whole number 7 can be thought of as $\frac{}{1}$.
So if we invert the whole number 7,
we get the proper fraction $\frac{1}{}$.

$\frac{7}{1}$

$\frac{1}{7}$

Invert:

$\frac{9}{1}$ $\frac{48}{1}$ 3 179

$\frac{1}{9}$ $\frac{1}{48}$ $\frac{1}{3}$ $\frac{1}{179}$

$\frac{4}{2}$ ← This line means divide if possible.

$\frac{4}{2} = 2 \left(2 \overline{)\, 4}^{\,2} \right)$

We divided the numerator by the denominator.

3

4

whole numbers

$\frac{6}{2} =$ $\frac{8}{2} =$

We changed the improper fractions to proper fractions. whole numbers.

2

3

$\frac{10}{5} =$ $\frac{9}{3} =$

6

5

$\frac{12}{2} =$ $\frac{15}{3} =$

3

4

$\frac{21}{7} =$ $\frac{16}{4} =$

7

6

$\frac{35}{5} =$ $\frac{24}{4} =$

9

8

$\frac{63}{7} =$ $\frac{72}{9} =$

TEST

$\frac{1}{8}$

$\frac{1}{2} \times \frac{1}{4} =$

$\frac{2}{15}$

$\frac{2}{5} \times \frac{1}{3} =$

$\frac{8}{21}$

$\frac{4}{7} \times \frac{2}{3} =$

$\frac{5}{54}$

$\frac{5}{9} \times \frac{1}{6} =$

$\frac{7}{2}$

Circle the improper fraction:

$\frac{2}{9}$ $\frac{7}{2}$

$\frac{5}{9}$ $\frac{12}{7}$

Invert these fractions:

$\frac{9}{5}$ $\frac{7}{12}$

2

Change the improper fractions to whole numbers :

$\frac{6}{3} =$

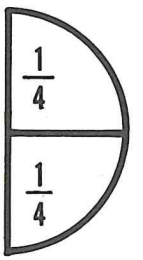
5

$\frac{20}{4} =$

9

$\frac{45}{5} =$

Dividing Fractions

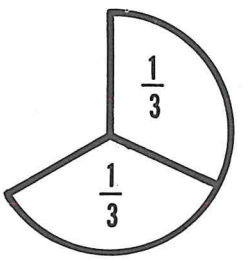


Here is $\frac{1}{2}$ of a circle.

How many $\frac{1}{4}$'s are there in $\frac{1}{2}$ of a circle? _____

2

So $\frac{1}{2} \div \frac{1}{4} = 2$



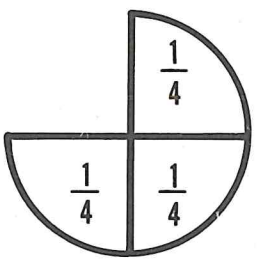
Here is $\frac{2}{3}$ of a circle.

How many $\frac{1}{3}$'s are there in $\frac{2}{3}$ of a circle? ____

2

2

So $\frac{2}{3} \div \frac{1}{3} =$



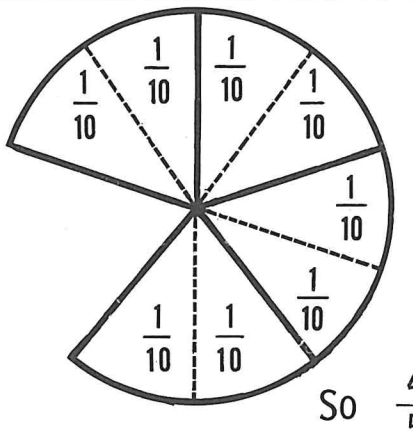
Here is $\frac{3}{4}$ of a circle.

How many $\frac{1}{4}$'s are there in $\frac{3}{4}$? _____

3

3

So $\frac{3}{4} \div \frac{1}{4} =$



Here is $\frac{4}{5}$ of a circle.

How many $\frac{1}{10}$'s are there in $\frac{4}{5}$? _____

8

8

So $\frac{4}{5} \div \frac{1}{10} =$

$\frac{1}{6}$

$\frac{6}{1}$

$\frac{6}{2}$

3

3

correct

$$\frac{1}{2} \div \frac{1}{6} = \ ?$$

We are dividing $\frac{1}{2}$ by $\frac{1}{\ }$.

To divide by a fraction, we must first invert it.

$\frac{1}{6}$ inverted is $\frac{\ }{\ }$.

Now we multiply:

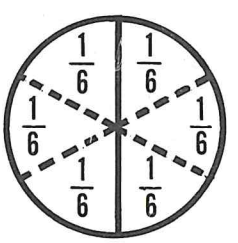
$$\frac{1}{2} \times \frac{6}{1} = \frac{\ }{2}$$

But $\frac{6}{2}$ is an improper fraction.

$$\frac{6}{2} =$$

So there are three $\frac{1}{6}$'s in $\frac{1}{2}$.

Let's check with a circle.



We divide the circle into six parts.

Each part is $\frac{1}{6}$ of the circle.

How many of these parts are there in $\frac{1}{2}$ of the circle? $____$

Our answer is correct. / incorrect.

	$\frac{1}{2} \div \frac{1}{8} = ?$
$\frac{8}{1}$	$\frac{1}{8}$ inverted is ___.
$\frac{8}{2}$	$\frac{1}{2} \times \frac{8}{1} =$ ___
4	$\frac{8}{2} =$
multiply	To divide by a fraction, we invert it and then multiply. / subtract.
an improper	If we get a proper / an improper fraction,
b.	we then divide ___a. the denominator by the numerator. ___b. the numerator by the denominator.
	$\frac{1}{3} \div \frac{1}{6} = ?$
$\frac{6}{1}$	$\frac{1}{6}$ inverted is ___.
$\frac{6}{3}$	$\frac{1}{3} \times \frac{6}{1} =$ ___
2	$\frac{6}{3} =$

	$\frac{3}{4} \div \frac{4}{5} = ?$
$\frac{5}{4}$	$\frac{4}{5}$ inverted is ——.
$\frac{15}{16}$	$\frac{3}{4} \times \frac{5}{4} =$ ——
a proper	Our answer is a proper / an improper fraction.
	$\frac{2}{5} \div \frac{2}{15} = ?$
$\frac{15}{2}$	$\frac{2}{15}$ inverted is ——.
$\frac{30}{10}$	$\frac{2}{5} \times \frac{15}{2} =$ ——
3	$\frac{30}{10} =$
	$\frac{2}{3} \div \frac{1}{9} = ?$
$\frac{2}{3} \times \frac{9}{1} = \frac{18}{3}$	$\frac{2}{3} \times \frac{}{1} =$ ——
6	$\frac{18}{3} =$
	$\frac{2}{3} \div \frac{5}{7} = ?$
$\frac{2}{3} \times \frac{7}{5} = \frac{14}{15}$	$\frac{2}{3} \times$ —— = ——

$\frac{3}{4} \times \frac{8}{3} = \frac{24}{12} = 2$	$\frac{3}{4} \div \frac{3}{8} = ?$ $\frac{3}{4} \times \text{—} = \text{—} = 2$
$\frac{2}{5} \times \frac{10}{1} = \frac{20}{5} = 4$	$\frac{2}{5} \div \frac{1}{10} = ?$
$\frac{5}{6} \times \frac{12}{1} = \frac{60}{6} = 10$	$\frac{5}{6} \div \frac{1}{12} = ?$
$\frac{4}{5} \times \frac{15}{2} = \frac{60}{10} = 6$	$\frac{4}{5} \div \frac{2}{15} = ?$
$\frac{5}{6} \times \frac{7}{6} = \frac{35}{36}$	$\frac{5}{6} \div \frac{6}{7} = ?$

$\frac{9}{11}$	TEST
$\frac{3}{17}$	$\frac{7}{11} + \frac{2}{11} =$ $\qquad$ $\frac{8}{17} - \frac{5}{17} =$
$\frac{4}{15}$	
$\frac{6}{21}$	$\frac{2}{5} \times \frac{2}{3} =$ $\qquad$ $\frac{3}{7} \times \frac{2}{3} =$
4	$\frac{2}{3} \div \frac{1}{6} = ?$ $\qquad$ $\frac{3}{4} \div \frac{3}{8} = ?$
2	
3	$\frac{1}{2} \div \frac{1}{6} = ?$ $\qquad$ $\frac{2}{3} \div \frac{5}{7} = ?$
$\frac{14}{15}$	
3	$\frac{1}{3} \div \frac{1}{9} = ?$ $\qquad$ $\frac{4}{5} \div \frac{5}{6} = ?$
$\frac{24}{25}$	

To divide or multiply a fraction by a whole number, think of the whole number as an improper fraction.

$$\frac{3}{1} \times \frac{1}{4} = \frac{3}{4}$$

$\frac{2}{3}$

$$\frac{2}{1} \times \frac{1}{3} = \frac{\quad}{3}$$

$\frac{4}{7}$

$$4 \times \frac{1}{7} = \frac{4}{\quad}$$

$\frac{4}{5}$

$$2 \times \frac{2}{5} = \frac{\quad}{\quad}$$

$\frac{6}{11}$

$$3 \times \frac{2}{11} = \frac{\quad}{\quad}$$

$$\frac{1}{3} \div \frac{2}{1} = ?$$

Invert the improper fraction and multiply:

$\frac{1}{6}$

$$\frac{1}{3} \times \frac{1}{2} = \frac{1}{\quad}$$

$$\frac{1}{4} \div \frac{3}{1} = ?$$

$\frac{1}{4} \times \frac{1}{3} = \frac{1}{12}$

$$\frac{1}{4} \times \frac{1}{\quad} = \frac{1}{12}$$

$\frac{1}{4}$	$\frac{3}{7} \div 4 = ?$ 4 inverted is $\frac{\quad}{\quad}$. $\frac{3}{7} \times \frac{\quad}{\quad} = \frac{\quad}{\quad}$
$\frac{3}{7} \times \frac{1}{4} = \frac{3}{28}$	
$\frac{2}{3} \times \frac{1}{5} = \frac{2}{15}$	$\frac{2}{3} \div 5 = ?$
$\frac{5}{6} \times \frac{1}{3} = \frac{5}{18}$	$\frac{5}{6} \div 3 = ?$
$\frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$	$\frac{1}{3} \div 2 = ?$
$\frac{4}{5} \times \frac{1}{7} = \frac{4}{35}$	$\frac{4}{5} \div 7 = ?$

$\frac{4}{5}$	$2 \times \frac{2}{5} =$ $\quad$ $3 \times \frac{2}{11} =$
$\frac{6}{11}$	
$\frac{1}{12}$	$\frac{1}{2} \div 6 = ?$ $\quad$ $\frac{5}{16} \div 2 = ?$
$\frac{5}{32}$	
$\frac{5}{7}$	$5 \times \frac{1}{7} =$ $\quad$ $2 \times \frac{1}{9} =$
$\frac{2}{9}$	
$\frac{7}{24}$	$\frac{7}{8} \div 3 = ?$ $\quad$ $\frac{9}{10} \div 10 = ?$
$\frac{9}{100}$	
$\frac{12}{17}$	$3 \times \frac{4}{17} =$ $\quad$ $6 \times \frac{3}{19} =$
$\frac{18}{19}$	

Reducing Fractions

The top and bottom parts of a fraction are called its terms.

The numerator is the top term. ⟶ $\frac{1}{14}$ ⟵ The denominator is the bottom term.

3

4

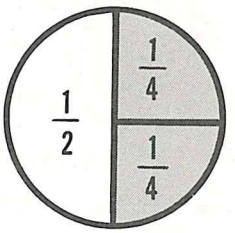
The terms of the fraction $\frac{3}{4}$ are the numerator ____ and the denominator ____.

11

12

The terms of the fraction $\frac{11}{12}$ are the numerator ____ and the denominator ____.

$\frac{2}{4}$



$\frac{1}{4} + \frac{1}{4} = \frac{2}{\quad}$

$\frac{2}{4}$ of the circle is the same as $\frac{1}{2}$ of it.

so $\frac{2}{4} = \frac{1}{2}$

We have reduced the fraction $\frac{2}{4}$ to $\frac{1}{2}$.

To reduce a fraction, we divide both terms by the same number. This number must divide the numerator and the denominator evenly (without leaving a remainder).

We can divide 2 and 4 evenly by 2.

$\frac{1}{2}$

so $\frac{2}{4} = \frac{1}{\quad}$ (4 ÷ 2)

Let's try to reduce the fraction $\frac{2}{5}$. We can divide 2 evenly by 2. But $5 \div 2 = 2 \text{ r } 1$

no

Can we divide 5 evenly by 2? yes / no

We can divide 5 evenly only by 5.

no

Can we divide 2 evenly by 5? yes / no

The fraction $\frac{2}{5}$ cannot be reduced. We say that it is in lowest terms.

$\frac{4}{5}$

The fraction $\frac{4}{5}$ / $\frac{2}{4}$ is in lowest terms.

In each of the following pairs, circle the fraction that is in lowest terms:

$\frac{1}{3}$	$\frac{2}{6}$
$\frac{1}{4}$	$\frac{2}{8}$
$\frac{4}{6}$	$\frac{2}{3}$
$\frac{3}{5}$	$\frac{6}{10}$
$\frac{2}{12}$	$\frac{1}{6}$

$\frac{1}{4}$

$\frac{2}{3}$

$\frac{3}{5}$

$\frac{1}{6}$

$\frac{2}{5}$

$\frac{6}{7}$

$\frac{16}{19}$

$\left(\frac{20}{5}\right) = 4$

$\frac{3}{20}$

$\frac{5}{16}$

$\frac{7}{27}$

$\left(\frac{12}{4}\right) = 3$

$\frac{1}{7}$

$\frac{7}{9}$

TEST

$2 \times \frac{1}{5} =$

$\frac{2}{7} \times 3 =$

$8 \times \frac{2}{19} =$

$\frac{4}{5} \times 5 =$

$\frac{3}{4} \div 5 = ?$

$\frac{5}{8} \div 2 = ?$

$\frac{3}{4} \times \frac{1}{5} =$

$\frac{7}{9} \div 3 = ?$

$\frac{3}{4} \div \frac{1}{4} = ?$

In each pair, circle the fraction that is in lowest terms:

$\frac{1}{7}$ $\quad$ $\frac{2}{14}$

$\frac{14}{18}$ $\quad$ $\frac{7}{9}$

To reduce a fraction, we must always divide both terms evenly by the same number.

Reduce to lowest terms by dividing both terms by 2:

$\frac{2}{3}$	$\frac{4}{6} = \frac{2}{\quad}$
$\frac{3}{4}$	$\frac{6}{8} = \frac{\quad}{4}$
$\frac{4}{5}$	$\frac{8}{10} = \frac{\quad}{\quad}$
$\frac{5}{6}$	$\frac{10}{12} = \frac{\quad}{\quad}$
$\frac{6}{7}$	$\frac{12}{14} = \frac{\quad}{\quad}$

Reduce to lowest terms by dividing both terms by 3:

$\frac{1}{2}$	$\frac{3}{6} = \frac{\quad}{2}$
$\frac{1}{3}$	$\frac{3}{9} = \frac{1}{\quad}$
$\frac{3}{4}$	$\frac{9}{12} = \frac{\quad}{\quad}$
$\frac{1}{5}$	$\frac{3}{15} = \frac{\quad}{\quad}$
$\frac{4}{7}$	$\frac{12}{21} = \frac{\quad}{\quad}$

3	To reduce a proper fraction to lowest terms, first try dividing both terms by the numerator. The numerator of the fraction $\frac{3}{21}$ is ____.
$\frac{1}{7}$	$\frac{3}{21} = \frac{1}{(21 \div 3)}$ $(3 \div 3)$
yes	Is $\frac{1}{7}$ in lowest terms? yes / no
	$\frac{6}{15} = ?$ $15 \div 6 = 2$ r 3 So we have to try the next smallest number that will divide the numerator 6 evenly.
no	Is it 5? $(6 \div 5 = 1$ r $1)$ yes / no
no	Is it 4? $(6 \div 4 = 1$ r $2)$ yes / no
yes	Is it 3? $(6 \div 3 = 2)$ yes / no
$\frac{2}{5}$	$\frac{6}{15} = \frac{2}{(15 \div 3)}$
yes	Is $\frac{2}{5}$ in lowest terms? yes / no

	Reduce to lowest terms:
$\frac{3}{4}$	$\frac{12}{16} = \frac{3}{\quad}\ \begin{matrix}(12 \div 4)\\(16 \div 4)\end{matrix}$
$\frac{2}{3}$	$\frac{8}{12} = \frac{\quad}{\quad}$
$\frac{3}{5}$	$\frac{15}{25} = \frac{3}{\quad}\ \begin{matrix}(15 \div 5)\\(25 \div 5)\end{matrix}$
$\frac{5}{8}$	$\frac{25}{40} = \frac{\quad}{\quad}$
$\frac{2}{3}$	$\frac{14}{21} = \frac{2}{\quad}\ \begin{matrix}(14 \div 7)\\(21 \div 7)\end{matrix}$
$\frac{1}{3}$	$\frac{6}{18} = \frac{\quad}{\quad}$
$\frac{1}{2}$	$\frac{8}{16} = \frac{1}{\quad}$
$\frac{1}{3}$	$\frac{9}{27} =$
$\frac{7}{8}$	$\frac{14}{16} =$
$\frac{1}{5}$	$\frac{4}{20} =$
$\frac{9}{10}$	$\frac{45}{50} =$

$\frac{1}{7}$	Reduce to lowest terms:
$\frac{3}{5}$	$\frac{2}{14} = __$ $\quad\quad$ $\frac{9}{15} = __$
$\frac{1}{4}$	$\frac{4}{16} = __$ $\quad\quad$ $\frac{5}{25} = __$
$\frac{1}{5}$	
$\frac{5}{7}$	$\frac{15}{21} = __$ $\quad\quad$ $\frac{7}{42} = __$
$\frac{1}{6}$	
$\frac{3}{5}$	$\frac{24}{40} = __$ $\quad\quad$ $\frac{20}{28} = __$
$\frac{5}{7}$	
$\frac{4}{5}$	$\frac{36}{45} = __$ $\quad\quad$ $\frac{35}{40} = __$
$\frac{7}{8}$	

	Always reduce answers to lowest terms.
$\frac{2}{6}$	$\frac{1}{6} + \frac{1}{6} = \frac{\quad}{6} = \frac{1}{3}$
$\frac{3}{4}$	$\frac{5}{8} + \frac{1}{8} = \frac{6}{8} = \frac{\quad}{3}$
$\frac{5}{10} = \frac{1}{2}$	$\frac{3}{10} + \frac{2}{10} = \frac{\quad}{10} = \frac{\quad}{2}$
$\frac{8}{12} = \frac{2}{3}$	$\frac{1}{12} + \frac{7}{12} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$
$\frac{7}{14} = \frac{1}{2}$	$\frac{3}{14} + \frac{4}{14} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$
$\frac{6}{9}$	$\frac{8}{9} - \frac{2}{9} = \frac{\quad}{9} = \frac{2}{3}$
$\frac{1}{2}$	$\frac{3}{4} - \frac{1}{4} = \frac{2}{4} = \frac{\quad}{1}$
$\frac{6}{16} = \frac{3}{8}$	$\frac{9}{16} - \frac{3}{16} = \frac{\quad}{16} = \frac{\quad}{8}$
$\frac{8}{20} = \frac{2}{5}$	$\frac{15}{20} - \frac{7}{20} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$
$\frac{10}{18} = \frac{5}{9}$	$\frac{17}{18} - \frac{7}{18} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$
$\frac{8}{28} = \frac{2}{7}$	$\frac{15}{28} - \frac{7}{28} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$

	TEST
$\frac{2}{3}$	$\frac{4}{9} + \frac{2}{9} =$
$\frac{1}{3}$	$\frac{5}{6} - \frac{3}{6} =$
$\frac{3}{4}$	$\frac{6}{12} + \frac{3}{12} =$
$\frac{1}{4}$	$\frac{7}{8} - \frac{5}{8} =$
$\frac{3}{8}$	$\frac{5}{16} + \frac{1}{16} =$
$\frac{3}{5}$	$\frac{9}{10} - \frac{3}{10} =$
$\frac{4}{5}$	$\frac{9}{15} + \frac{3}{15} =$
$\frac{2}{3}$	$\frac{13}{15} - \frac{3}{15} =$
$\frac{5}{6}$	$\frac{7}{18} + \frac{8}{18} =$
$\frac{1}{6}$	$\frac{7}{24} - \frac{3}{24} =$

$\frac{12}{78}$

$$\frac{12}{13} \times \frac{1}{6} = \frac{\quad}{78}$$

To reduce $\frac{12}{78}$, we divide both terms by 6:

$$\frac{12}{78} = \frac{\quad}{13}$$

$\frac{2}{13}$

We can simplify the problem by reducing some of the terms <u>before</u> we multiply.

We need to divide a numerator and a denominator by the same number.

We can divide this numerator by 6. → $\frac{12}{13} \times \frac{1}{6}$ ← We can also divide this denominator by 6.

$$(12 \div 6)\ \frac{\overset{2}{\cancel{12}}}{13} \times \frac{1}{\underset{1}{\cancel{6}}}\ (6 \div 6)$$

$\frac{2}{13}$

so $\frac{2}{13} \times \frac{1}{1} = \frac{\quad}{\quad}$

$$(3 \div 3)\ \frac{2}{\underset{1}{\cancel{3}}} \times \frac{\overset{2}{\cancel{6}}}{7}\ (6 \div 3)$$

$\frac{4}{7}$

so $\frac{2}{1} \times \frac{2}{7} = \frac{\quad}{7}$

	$\frac{\overset{1}{\cancel{4}}}{5} \times \frac{3}{\underset{2}{\cancel{8}}} = \ ?$
$\frac{3}{10}$	$\frac{1}{5} \times \frac{3}{2} = \frac{\quad}{10}$
$\frac{1}{18}$	$\frac{1}{\underset{6}{\cancel{12}}} \times \frac{\overset{1}{\cancel{2}}}{3} = \frac{\quad}{18}$
$\frac{3}{5}$	$\frac{\overset{1}{\cancel{4}}}{5} \times \frac{3}{\underset{1}{\cancel{4}}} = \frac{\quad}{\quad}$
$\frac{2}{35}$	$\frac{\overset{1}{\cancel{5}}}{7} \times \frac{2}{\underset{5}{\cancel{25}}} = \frac{\quad}{\quad}$
$\frac{4}{\underset{5}{\cancel{15}}} \times \frac{\overset{2}{\cancel{6}}}{5} = \frac{8}{25}$	$\frac{4}{15} \times \frac{6}{5} = \frac{\quad}{\quad}$
$\frac{\overset{2}{\cancel{6}}}{9} \times \frac{5}{\underset{3}{\cancel{9}}} = \frac{10}{27}$	$\frac{6}{9} \times \frac{5}{9} = \frac{\quad}{\quad}$
$\frac{3}{\underset{1}{\cancel{7}}} \times \frac{\overset{1}{\cancel{7}}}{8} = \frac{3}{8}$	$\frac{3}{7} \times \frac{7}{8} = \frac{\quad}{\quad}$

$\frac{7}{15}$	$\frac{7}{12} \times \frac{4}{5} =$	$\frac{5}{8} \times \frac{1}{10} =$
$\frac{1}{16}$		
$\frac{11}{20}$	$\frac{11}{18} \times \frac{9}{10} =$	$\frac{12}{13} \times \frac{5}{36} =$
$\frac{5}{39}$		
$\frac{3}{8}$	$\frac{9}{21} \times \frac{7}{8} =$	$\frac{4}{7} \times \frac{3}{10} =$
$\frac{6}{35}$		
$\frac{2}{7}$	$\frac{1}{3} \times \frac{6}{7} =$	$\frac{4}{5} \times \frac{1}{12} =$
$\frac{1}{15}$		
$\frac{6}{49}$	$\frac{5}{7} \times \frac{6}{35} =$	$\frac{11}{21} \times \frac{7}{8} =$
$\frac{11}{24}$		
$\frac{14}{31}$	$\frac{2}{3} \times \frac{21}{31} =$	$\frac{7}{8} \times \frac{24}{29} =$
$\frac{21}{29}$		

$\frac{3}{1}$

$\frac{1}{2}$

$\frac{1}{6} \div \frac{1}{3} = ?$

$\frac{1}{3}$ inverted is $\frac{\quad}{\quad}$.

$\frac{\overset{1}{\cancel{1}}}{\underset{2}{\cancel{6}}} \times \frac{\overset{1}{\cancel{3}}}{1} = \frac{1}{\quad}$

$\frac{1}{4}$

$\frac{1}{7}$

$\frac{4}{7} \div 4 = ?$

4 inverted is $\frac{\quad}{\quad}$.

$\frac{\overset{1}{\cancel{4}}}{7} \times \frac{1}{\underset{1}{\cancel{4}}} = \frac{\quad}{7}$

$\frac{\overset{1}{\cancel{2}}}{5} \times \frac{1}{\underset{1}{\cancel{2}}} = \frac{1}{5}$

$\frac{5}{\underset{2}{\cancel{16}}} \times \frac{\overset{1}{\cancel{8}}}{3} = \frac{5}{6}$

$\frac{7}{\underset{3}{\cancel{12}}} \times \frac{\overset{1}{\cancel{4}}}{3} = \frac{7}{9}$

$\frac{\overset{2}{\cancel{10}}}{11} \times \frac{1}{\underset{1}{\cancel{5}}} = \frac{2}{11}$

$\frac{2}{5} \div 2 = ?$

$\frac{2}{5} \times \frac{1}{2} = \frac{\quad}{\quad}$

$\frac{7}{12} \div \frac{3}{4} = ?$

$\frac{5}{16} \div \frac{3}{8} = ?$

$\frac{5}{16} \times \frac{8}{3} = \frac{\quad}{\quad}$

$\frac{10}{11} \div 5 = ?$

$\frac{\overset{1}{\cancel{2}}}{3} \times \frac{5}{\underset{2}{\cancel{4}}} = \frac{5}{6}$

$\frac{\overset{1}{\cancel{7}}}{8} \times \frac{1}{\underset{2}{\cancel{14}}} = \frac{1}{16}$

$\frac{2}{3} \div \frac{4}{5} = ?$

$\frac{7}{8} \div 14 = ?$

$\frac{1}{2}$

$\frac{9}{15} = \frac{3}{5}$

$\frac{5}{25} = \frac{1}{5}$

$\frac{4}{24} = \frac{1}{6}$

$\frac{2}{7}$

$\frac{\overset{1}{\cancel{4}}}{5} \times \frac{1}{\underset{3}{\cancel{12}}} = \frac{1}{15}$

$\frac{\overset{1}{\cancel{5}}}{7} \times \frac{6}{\underset{7}{\cancel{35}}} = \frac{6}{49}$

$\frac{11}{\underset{3}{\cancel{21}}} \times \frac{\overset{1}{\cancel{7}}}{8} = \frac{11}{24}$

$\frac{\overset{2}{\cancel{20}}}{31} \times \frac{1}{\underset{1}{\cancel{10}}} = \frac{2}{31}$

$\frac{9}{\underset{2}{\cancel{24}}} \times \frac{\overset{1}{\cancel{12}}}{7} = \frac{9}{14}$

$\frac{5}{16} + \frac{3}{16} = \frac{8}{16} = \text{—}$

$\frac{2}{15} + \frac{7}{15} = \text{—} = \text{—}$

$\frac{8}{25} - \frac{3}{25} = \text{—} = \text{—}$

$\frac{11}{24} - \frac{7}{24} = \text{—} = \text{—}$

$\frac{1}{\cancel{3}} \times \frac{\cancel{6}}{7} = \text{—}$ $\qquad$ $\frac{4}{5} \times \frac{1}{12} =$

$\frac{5}{7} \times \frac{6}{35} = \text{—}$ $\qquad$ $\frac{11}{21} \times \frac{7}{8} =$

$\frac{20}{31} \div 10 = ?$ $\qquad$ $\frac{9}{24} \div \frac{7}{12} = ?$

FINAL EXAM - Side 1

$\frac{4}{7} + \frac{2}{7} =$ $\frac{3}{11} + \frac{5}{11} =$ $\frac{6}{19} + \frac{7}{19} =$

$\frac{5}{9} - \frac{3}{9} =$ $\frac{15}{21} - \frac{11}{21} =$ $\frac{4}{5} - \frac{3}{5} =$

$\frac{3}{4} \times \frac{1}{5} =$ $\frac{5}{6} \times \frac{3}{4} =$ $\frac{7}{9} \times \frac{2}{3} =$

$\frac{5}{7} \div 3 = ?$ $\frac{4}{5} \div \frac{7}{8} = ?$ $\frac{6}{11} \div \frac{3}{4} = ?$

Reduce to lowest terms:

$\frac{12}{20} =$ $\frac{10}{30} =$ $\frac{21}{27} =$

$\frac{15}{16} \times \frac{3}{5} =$ $\frac{6}{21} \times \frac{7}{8} =$

$\frac{8}{9} \div 4 = ?$ $\frac{5}{7} \div \frac{11}{14} = ?$ $\frac{9}{17} \div \frac{3}{5} = ?$

Turn the book over and continue with page 49.

Mixed Numbers

$2\frac{1}{3}$ is a <u>mixed</u> number. It is made up of

___ a. just a whole number.
___ b. just a fraction.
___ c. a whole number and a fraction.

✓ c.

Circle the mixed numbers.

$5\frac{1}{2}$ $10\frac{8}{9}$ (6 $\frac{7}{8}$) 9 $\frac{3}{4}$ $5\frac{1}{2}$ $\frac{14}{19}$ 12 $10\frac{8}{9}$

$$\begin{array}{r} 2\frac{1}{5} \\ +\,4\frac{1}{5} \\ \hline ? \end{array}$$

Add the fractions first: $\frac{1}{5} + \frac{1}{5} = \frac{\quad}{5}$

$\frac{2}{5}$

$$\begin{array}{r} 2\frac{1}{5} \\ +\,4\frac{1}{5} \\ \hline ?\,\frac{2}{5} \end{array}$$

Now add the whole numbers: 2 + 4 = ____

6

$$\begin{array}{r} 2\frac{1}{5} \\ +\,4\frac{1}{5} \\ \hline 6\frac{2}{5} \end{array}$$

$7\frac{2}{3}$	$3\frac{1}{3} + 4\frac{1}{3} = \frac{2}{3}$	$5\frac{2}{7} + 4\frac{3}{7} = \frac{5}{}$
$9\frac{5}{7}$		
$8\frac{3}{4}$	$3\frac{1}{4} + 5\frac{2}{4}$	$6\frac{3}{8} + 7\frac{2}{8}$
$13\frac{5}{8}$		
$40\frac{7}{9}$	$17\frac{2}{9} + 23\frac{5}{9}$	$36\frac{3}{11} + 28\frac{6}{11}$
$64\frac{9}{11}$		
$20\frac{9}{10}$	$8\frac{1}{10}$ $5\frac{3}{10}$ $+ 7\frac{5}{10}$	$6\frac{5}{12}$ $9\frac{1}{12}$ $+ 18\frac{1}{12}$
$33\frac{7}{12}$		
$92\frac{4}{5}$	$37\frac{1}{5}$ $42\frac{2}{5}$ $+ 13\frac{1}{5}$	$15\frac{3}{13}$ $24\frac{4}{13}$ $+ 63\frac{5}{13}$
$102\frac{12}{13}$		

$\frac{3}{7}$	$6\frac{5}{7}$ $-\ 4\frac{2}{7}$? Subtract the fractions first. $\frac{5}{7} - \frac{2}{7} = \frac{\quad}{7}$
$2\frac{3}{7}$	$6\frac{5}{7}$ $-\ 4\frac{2}{7}$ $\frac{3}{7}$
$4\frac{3}{5}$	$7\frac{4}{5}$ $-\ 3\frac{1}{5}$ $\frac{3}{5}$
$7\frac{2}{9}$	$9\frac{7}{9}$ $-\ 2\frac{5}{9}$
$3\frac{1}{8}$	$14\frac{7}{8}$ $-\ 11\frac{6}{8}$
$6\frac{3}{10}$	$23\frac{8}{10}$ $-\ 17\frac{5}{10}$
$19\frac{5}{11}$	$38\frac{8}{11}$ $-\ 19\frac{3}{11}$
$16\frac{4}{13}$	$52\frac{12}{13}$ $-\ 36\frac{8}{13}$
$25\frac{11}{15}$	$109\frac{13}{15}$ $-\ 84\frac{2}{15}$
$186\frac{9}{17}$	$375\frac{14}{17}$ $-\ 189\frac{5}{17}$

4	We have changed improper fractions to whole numbers: $\frac{6}{2} = 3$ $\frac{12}{3} =$
3 r 1	Some improper fractions can be changed to mixed numbers: $\frac{7}{2} = ?$ $7 \div 2 = __ \text{r } 1$ We write the remainder 1 over the denominator: $\frac{7}{2} = 3\frac{1}{2}$ ←
$1\frac{1}{2}$	$\frac{5}{2} = 2\frac{1}{2}$ $\quad\quad$ $\frac{3}{2} = 1\frac{}{2}$
$4\frac{1}{2}$ $6\frac{1}{2}$	$\frac{9}{2} = \frac{1}{2}$ $\quad\quad$ $\frac{13}{2} = 6\frac{1}{}$
$5\frac{1}{2}$ $8\frac{1}{2}$	$\frac{11}{2} = 5\frac{}{}$ $\quad\quad$ $\frac{17}{2} = 8\frac{}{}$
$7\frac{1}{2}$ $9\frac{1}{2}$	$\frac{15}{2} = \frac{1}{2}$ $\quad\quad$ $\frac{19}{2} =$

$1\frac{1}{3}$ $1\frac{2}{3}$	$\frac{4}{3} = 1\frac{}{3}$ $\quad$ $\frac{5}{3} = 1\frac{2}{}$
$2\frac{2}{3}$ $1\frac{1}{4}$	$\frac{8}{3} = \frac{2}{3}$ $\quad$ $\frac{5}{4} = 1\frac{1}{}$
$2\frac{1}{3}$ $2\frac{1}{4}$	$\frac{7}{3} = \frac{}{3}$ $\quad$ $\frac{9}{4} =$
$3\frac{2}{3}$ $3\frac{3}{4}$	$\frac{11}{3} =$ $\quad$ $\frac{15}{4} =$
$4\frac{1}{4}$ $3\frac{1}{3}$	$\frac{17}{4} =$ $\quad$ $\frac{10}{3} =$
$1\frac{3}{4}$ $2\frac{3}{4}$	$\frac{7}{4} =$ $\quad$ $\frac{11}{4} =$
$4\frac{1}{3}$ $4\frac{3}{4}$	$\frac{13}{3} =$ $\quad$ $\frac{19}{4} =$

	TEST
$16\frac{5}{6}$	$7\frac{1}{6} + 9\frac{4}{6}$ $12\frac{7}{15} + 84\frac{4}{15}$
$96\frac{11}{15}$	
$9\frac{1}{3}$	$17\frac{2}{3} - 8\frac{1}{3}$ $427\frac{5}{6} - 206\frac{4}{6}$
$221\frac{1}{6}$	
$1\frac{1}{5}$	Change to mixed numbers: $\frac{6}{5} = 1\frac{1}{}$ $\frac{21}{4} = 5\frac{}{4}$
$5\frac{1}{4}$	
$4\frac{2}{3}$	$\frac{14}{3} = \frac{2}{3}$ $\frac{7}{5} =$
$1\frac{2}{5}$	
$1\frac{5}{6}$	$\frac{11}{6} =$ $\frac{16}{3} =$
$5\frac{1}{3}$	
$5\frac{3}{4}$	$\frac{23}{4} =$ $\frac{8}{5} =$
$1\frac{3}{5}$	

$1\frac{1}{3}$	Any answer that is an improper fraction should be changed to a mixed number. $\frac{2}{3} + \frac{2}{3} = \frac{4}{3}$ $\frac{4}{3} = 1\frac{1}{}$
$1\frac{2}{7}$	$\frac{5}{7} + \frac{4}{7} = \frac{9}{7} = 1\frac{}{7}$
$1\frac{2}{9}$	$\frac{4}{9} + \frac{7}{9} = \frac{11}{9} = 1\frac{}{9}$
$2\frac{1}{3}$	$\frac{5}{3} + \frac{2}{3} = \frac{7}{3} =$
$\frac{16}{5} = 3\frac{1}{5}$	$\frac{7}{5} + \frac{9}{5} = \frac{}{5} =$
$\frac{13}{3} = 4\frac{1}{3}$	$\frac{7}{3} + \frac{6}{3} =$
$\frac{15}{7} = 2\frac{1}{7}$	$\frac{9}{7} + \frac{6}{7} =$
$\frac{5}{4} = 1\frac{1}{4}$	$\frac{3}{4} + \frac{2}{4} =$
$\frac{19}{16} = 1\frac{3}{16}$	$\frac{11}{16} + \frac{8}{16} =$

$1\frac{2}{3}$	$\frac{10}{3} - \frac{5}{3} = \frac{5}{3} = 1\text{—}$
$\frac{11}{5} = 2\frac{1}{5}$	$\frac{17}{5} - \frac{6}{5} = \text{—} =$
$\frac{12}{7} = 1\frac{5}{7}$	$\frac{20}{7} - \frac{8}{7} =$
$\frac{22}{9} = 2\frac{4}{9}$	$\frac{29}{9} - \frac{7}{9} =$
$1\frac{1}{9}$	$\frac{5}{3} \times \frac{2}{3} = \frac{10}{9} =$
$\frac{25}{6} = 4\frac{1}{6}$	$\frac{5}{2} \times \frac{5}{3} =$
$\frac{21}{8} = 2\frac{5}{8}$	$\frac{7}{4} \times \frac{3}{2} =$
$3\frac{1}{3}$	$\frac{2}{3} \div \frac{1}{5} = ?$ $\frac{2}{3} \times \frac{5}{1} = \frac{10}{3} = \text{—}$
$\frac{3}{5} \times \frac{7}{2} = \frac{21}{10} = 2\frac{1}{10}$	$\frac{3}{5} \div \frac{2}{7} = ?$

Circle the improper fraction that is in lowest terms:

$\frac{3}{2}$	$\frac{6}{4}$
$\frac{8}{6}$	$\frac{4}{3}$
$\frac{16}{14}$	$\frac{8}{7}$
$\frac{3}{2}$	$\frac{9}{6}$
$\frac{6}{5}$	$\frac{18}{15}$
$\frac{27}{24}$	$\frac{9}{8}$

Reduce to lowest terms; then change to mixed numbers:

$\frac{8}{6} = \frac{4}{3} = 1\ __$

$\frac{12}{8} = \frac{3}{2} =$

$\frac{25}{20} =$

$\frac{27}{21} =$

$\frac{16}{12} =$

$\frac{4}{3}$
$\frac{8}{7}$
$\frac{3}{2}$
$\frac{6}{5}$
$\frac{9}{8}$
$1\frac{1}{3}$
$1\frac{1}{2}$
$\frac{5}{4} = 1\frac{1}{4}$
$\frac{9}{7} = 1\frac{2}{7}$
$\frac{4}{3} = 1\frac{1}{3}$

$\frac{5}{2} = 2\frac{1}{2}$	$\frac{10}{4} =$
$\frac{4}{3} = 1\frac{1}{3}$	$\frac{12}{9} =$
$\frac{8}{5} = 1\frac{3}{5}$	$\frac{16}{10} =$
$\frac{7}{6} = 1\frac{1}{6}$	$\frac{14}{12} =$
$\frac{5}{3} = 1\frac{2}{3}$	$\frac{15}{9} =$
$\frac{7}{5} = 1\frac{2}{5}$	$\frac{14}{10} =$
$\frac{8}{7} = 1\frac{1}{7}$	$\frac{16}{14} =$
$\frac{7}{3} = 2\frac{1}{3}$	$\frac{21}{9} =$
$\frac{6}{5} = 1\frac{1}{5}$	$\frac{12}{10} =$
$\frac{7}{6} = 1\frac{1}{6}$	$\frac{28}{24} =$
$\frac{9}{7} = 1\frac{2}{7}$	$\frac{45}{35} =$
$\frac{8}{3} = 2\frac{2}{3}$	$\frac{24}{9} =$

	Reduce each answer to lowest terms and then change it to a mixed number:
$1\frac{1}{2}$	$\frac{3}{4} + \frac{3}{4} = \frac{6}{4} = \frac{3}{2} = 1\frac{}{2}$
$1\frac{2}{3}$	$\frac{5}{6} + \frac{5}{6} = \frac{10}{6} = \frac{5}{3} =$
$\frac{5}{4} = 1\frac{1}{4}$	$\frac{7}{8} + \frac{3}{8} = \frac{10}{8} = \frac{\quad}{\quad} =$
$\frac{22}{14} = \frac{11}{7} = 1\frac{4}{7}$	$\frac{13}{14} + \frac{9}{14} = \frac{\quad}{\quad} = \frac{\quad}{\quad} =$
$\frac{16}{10} = \frac{8}{5} = 1\frac{3}{5}$	$\frac{9}{10} + \frac{7}{10} =$
$\frac{18}{12} = \frac{3}{2} = 1\frac{1}{2}$	$\frac{11}{12} + \frac{7}{12} =$
$\frac{28}{16} = \frac{7}{4} = 1\frac{3}{4}$	$\frac{13}{16} + \frac{15}{16} =$
$\frac{20}{14} = \frac{10}{7} = 1\frac{3}{7}$	$\frac{11}{14} + \frac{9}{14} =$
$\frac{21}{9} = \frac{7}{3} = 2\frac{1}{3}$	$\frac{8}{9} + \frac{8}{9} + \frac{5}{9} =$
$\frac{39}{18} = \frac{13}{6} = 2\frac{1}{6}$	$\frac{15}{18} + \frac{13}{18} + \frac{11}{18} =$

$\frac{8}{7} = 1\frac{1}{7}$

$\frac{9}{5} = 1\frac{4}{5}$

$\frac{21}{8} = 2\frac{5}{8}$

$\frac{1}{3} \times \frac{8}{1} = \frac{8}{3} = 2\frac{}{3}$

$\frac{10}{9} = 1\frac{1}{9}$

$\frac{6}{5} = 1\frac{1}{5}$

$\frac{9}{4} = 2\frac{1}{4}$

$\frac{7}{2} = 3\frac{1}{2}$

$\frac{9}{6} = \frac{3}{2} = 1\frac{1}{2}$

$\frac{18}{8} = \frac{9}{4} = 2\frac{1}{4}$

TEST

$\frac{3}{7} + \frac{5}{7} =$

$\frac{17}{5} - \frac{8}{5} =$

$\frac{7}{4} \times \frac{3}{2} =$

$\frac{1}{3} \div \frac{1}{8} = ?$

Reduce to lowest terms and change to mixed numbers:

$\frac{30}{27} =$ $\frac{36}{30} =$

$\frac{90}{40} =$ $\frac{42}{12} =$

$\frac{4}{6} + \frac{5}{6} =$

$\frac{5}{8} + \frac{7}{8} + \frac{6}{8} =$

$1\frac{1}{5}$	Remember to reduce improper fractions to lowest terms and change them to mixed numbers. $\frac{19}{15} - \frac{1}{15} = \frac{18}{15} = \frac{6}{5} = 1\frac{1}{\ }$
$1\frac{1}{2}$	$\frac{9}{4} - \frac{3}{4} = \frac{6}{4} = \frac{3}{2} =$
$\frac{5}{4} = 1\frac{1}{4}$	$\frac{23}{12} - \frac{8}{12} = \frac{15}{12} = \text{—} =$
$\frac{10}{6} = \frac{5}{3} = 1\frac{2}{3}$	$\frac{11}{6} - \frac{1}{6} = \frac{\ }{6} = \text{—} =$
$\frac{34}{16} = \frac{17}{8} = 2\frac{1}{8}$	$\frac{43}{16} - \frac{9}{16} =$
$\frac{12}{8} = \frac{3}{2} = 1\frac{1}{2}$	$\frac{19}{8} - \frac{7}{8} =$
$\frac{24}{9} = \frac{8}{3} = 2\frac{2}{3}$	$\frac{31}{9} - \frac{7}{9} =$
$\frac{18}{14} = \frac{9}{7} = 1\frac{2}{7}$	$\frac{27}{14} - \frac{9}{14} =$
$\frac{22}{18} = \frac{11}{9} = 1\frac{2}{9}$	$\frac{35}{18} - \frac{13}{18} =$
$\frac{52}{24} = \frac{13}{6} = 2\frac{1}{6}$	$\frac{59}{24} - \frac{7}{24} =$

$1\frac{2}{3}$

$\frac{7}{6} = 1\frac{1}{6}$

$\frac{1}{\cancel{2}_{1}} \times \frac{\cancel{10}^{5}}{3} = \frac{5}{3} =$

$\frac{\cancel{2}^{1}}{3} \times \frac{7}{\cancel{4}_{2}} = \text{—} =$

$\frac{\cancel{3}^{1}}{\cancel{4}_{1}} \times \frac{\cancel{8}^{2}}{5} = \frac{6}{5} = 1\frac{1}{5}$

$\frac{3}{4} \times \frac{8}{5} =$

$\frac{\cancel{12}^{4}}{7} \times \frac{2}{\cancel{3}_{1}} = \frac{8}{7} = 1\frac{1}{7}$

$\frac{12}{7} \times \frac{2}{3} =$

$1\frac{1}{2}$

$4\frac{1}{2}$

Notice that we can sometimes reduce all 4 terms of a multiplication problem.

$\frac{\cancel{9}^{3}}{\cancel{16}_{2}} \times \frac{\cancel{8}^{1}}{\cancel{3}_{1}} = \frac{3}{2} =$

$\frac{\cancel{15}^{3}}{\cancel{8}_{2}} \times \frac{\cancel{12}^{3}}{\cancel{5}_{1}} = \frac{9}{2} =$

$\frac{\cancel{49}^{7}}{\cancel{6}_{3}} \times \frac{\cancel{2}^{1}}{\cancel{7}_{1}} = \frac{7}{3} = 2\frac{1}{3}$

$\frac{49}{6} \times \frac{2}{7} =$

$\frac{\cancel{24}^{8}}{\cancel{5}_{1}} \times \frac{\cancel{20}^{4}}{\cancel{21}_{7}} = \frac{32}{7} = 4\frac{4}{7}$

$\frac{24}{5} \times \frac{20}{21} =$

$1\frac{1}{2}$

$\frac{3}{7} \div \frac{2}{7} = ?$

$\frac{\cancel{3}}{\cancel{7}_{1}} \times \frac{\overset{1}{\cancel{7}}}{2} = \frac{3}{2} =$

$\frac{8}{5} = 1\frac{3}{5}$

$\frac{6}{5} \div \frac{3}{4} = ?$

$\frac{\overset{2}{\cancel{6}}}{5} \times \frac{4}{\cancel{3}_{1}} = \text{—} =$

$\frac{7}{\cancel{3}_{1}} \times \frac{\overset{3}{\cancel{9}}}{2} = \frac{21}{2} = 10\frac{1}{2}$

$\frac{7}{3} \div \frac{2}{9} = ?$

$\frac{7}{3} \times \frac{9}{2} =$

$\frac{7}{4} = 1\frac{3}{4}$

$\frac{21}{16} \div \frac{3}{4} = ?$

$\frac{\overset{7}{\cancel{21}}}{\cancel{16}_{4}} \times \frac{\overset{1}{\cancel{4}}}{\cancel{3}_{1}} =$

$\frac{\cancel{7}}{\cancel{8}_{4}} \times \frac{\overset{5}{\cancel{10}}}{\cancel{7}} = \frac{5}{4} = 1\frac{1}{4}$

$\frac{7}{8} \div \frac{7}{10} = ?$

$\frac{16}{3} \div 4 = ?$

$\frac{\overset{4}{\cancel{16}}}{3} \times \frac{1}{\underset{1}{\cancel{4}}} = \frac{4}{3} = 1\frac{1}{3}$

$\frac{9}{8} \div \frac{3}{4} = ?$

$\frac{\overset{3}{\cancel{9}}}{\underset{2}{\cancel{8}}} \times \frac{\overset{1}{\cancel{4}}}{\underset{1}{\cancel{3}}} = \frac{3}{2} = 1\frac{1}{2}$

$\frac{12}{7} \div \frac{4}{5} = ?$

$\frac{\overset{3}{\cancel{12}}}{7} \times \frac{5}{\underset{1}{\cancel{4}}} = \frac{15}{7} = 2\frac{1}{7}$

$\frac{7}{4} \div \frac{3}{8} = ?$

$\frac{7}{\underset{1}{\cancel{4}}} \times \frac{\overset{2}{\cancel{8}}}{3} = \frac{14}{3} = 4\frac{2}{3}$

$\frac{18}{7} \div \frac{15}{14} = ?$

$\frac{\overset{6}{\cancel{18}}}{\underset{1}{\cancel{7}}} \times \frac{\overset{2}{\cancel{14}}}{\underset{5}{\cancel{15}}} = \frac{12}{5} = 2\frac{2}{5}$

$\frac{24}{5} \div \frac{9}{10} = \quad ?$

$\frac{8}{\cancel{24}^{\,1}_{\,\cancel{5}}} \times \frac{2}{\cancel{10}^{\,\cancel{9}}_{\,3}} = \frac{16}{3} = 5\frac{1}{3}$

$\frac{14}{9} \div \frac{7}{5} = \quad ?$

$\frac{2}{\cancel{14}^{\,\cancel{9}}} \times \frac{5}{\cancel{7}_{\,1}} = \frac{10}{9} = 1\frac{1}{9}$

$\frac{49}{5} \div \frac{7}{2} = \quad ?$

$\frac{7}{\cancel{49}^{\,\cancel{5}}} \times \frac{2}{\cancel{7}_{\,1}} = \frac{14}{5} = 2\frac{4}{5}$

$\frac{3}{4} \div \frac{6}{13} = \quad ?$

$\frac{1}{\cancel{3}^{\,\cancel{4}}} \times \frac{13}{\cancel{6}_{\,2}} = \frac{13}{8} = 1\frac{5}{8}$

$\frac{17}{12} \div \frac{5}{4} = \quad ?$

$\frac{\cancel{17}^{\,\cancel{12}}_{\,3}}{} \times \frac{1}{\cancel{4}^{\,\cancel{5}}} = \frac{17}{15} = 1\frac{2}{15}$

$\frac{12}{8} = \frac{3}{2} = 1\frac{1}{2}$

$\frac{28}{21} = \frac{4}{3} = 1\frac{1}{3}$

$\frac{14}{10} = \frac{7}{5} = 1\frac{2}{5}$

$\frac{12}{9} = \frac{4}{3} = 1\frac{1}{3}$

$\frac{9}{\cancel{4}\,1} \times \frac{\overset{4}{\cancel{16}}}{5} = \frac{36}{5} = 7\frac{1}{5}$

$\frac{\overset{6}{\cancel{18}}}{7} \times \frac{10}{\cancel{3}\,1} = \frac{60}{7} = 8\frac{4}{7}$

$\frac{13}{\cancel{14}\,2} \times \frac{\overset{1}{\cancel{7}}}{3} = \frac{13}{6} = 2\frac{1}{6}$

$\frac{\overset{2}{\cancel{18}}}{5} \times \frac{7}{\cancel{8}\,1} = \frac{14}{5} = 2\frac{4}{5}$

$\frac{7}{\cancel{12}\,3} \times \frac{\overset{2}{\cancel{8}}}{3} = \frac{14}{9} = 1\frac{5}{9}$

$\frac{\overset{5}{\cancel{20}}}{3} \times \frac{1}{\cancel{4}\,1} = \frac{5}{3} = 1\frac{2}{3}$

TEST

$\frac{7}{8} + \frac{5}{8} = \text{—} = \text{—} =$

$\frac{17}{21} + \frac{11}{21} = \text{—} = \text{—} =$

$\frac{17}{10} - \frac{3}{10} = \text{—} = \text{—} =$

$\frac{25}{9} - \frac{13}{9} = \text{—} = \text{—} =$

$\frac{9}{4} \times \frac{16}{5} = \text{—} =$

$\frac{18}{7} \times \frac{10}{3} = \text{—} =$

$\frac{13}{14} \times \frac{7}{3} = \text{—} =$

$\frac{16}{5} \div \frac{8}{7} = ?$

$\frac{7}{12} \div \frac{3}{8} = ?$

$\frac{20}{3} \div 4 = ?$

	$2 + \frac{1}{2} = 2\frac{1}{2}$
$4\frac{1}{3}$	$4 + \frac{1}{3} = 4\frac{}{3}$
$7\frac{2}{5}$	$7 + \frac{2}{5} = 7\text{—}$
$3\frac{4}{9}$	$3 + \frac{4}{9} =$
$11\frac{7}{8}$	$11 + \frac{7}{8} =$
$7\frac{2}{3}$	$\begin{array}{r} 3 \\ 4 \\ +\ \frac{2}{3} \\ \hline \text{—}\frac{2}{3} \end{array}$ $\qquad$ $\begin{array}{r} 5 \\ 6 \\ +\ \frac{3}{8} \\ \hline 11\text{—} \end{array}$
$11\frac{3}{8}$	
$14\frac{1}{4}$	$\begin{array}{r} 5 \\ 7 \\ 2 \\ +\ \frac{1}{4} \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 10 \\ 9 \\ 14 \\ +\ \frac{6}{11} \\ \hline \end{array}$
$33\frac{6}{11}$	
$16\frac{6}{7}$	$\begin{array}{r} 7 \\ 4 \\ 5 \\ +\ \frac{6}{7} \\ \hline \end{array}$ $\qquad$ $\begin{array}{r} 9 \\ 6 \\ 8 \\ +\ \frac{7}{10} \\ \hline \end{array}$
$23\frac{7}{10}$	

$1\frac{1}{5}$

$2\frac{3}{8}$

Just bring down the fraction.

$$\begin{array}{r} 3\frac{1}{5} \\ -\ 2 \\ \hline -\frac{1}{5} \end{array}$$

$$\begin{array}{r} 7\frac{3}{8} \\ -\ 5 \\ \hline 2\frac{3}{} \end{array}$$

$4\frac{2}{3}$

$11\frac{5}{6}$

$$\begin{array}{r} 10\frac{2}{3} \\ -\ 6 \\ \hline 4- \end{array}$$

$$\begin{array}{r} 15\frac{5}{6} \\ -\ 4 \\ \hline \end{array}$$

$22\frac{7}{8}$

$25\frac{1}{2}$

$$\begin{array}{r} 29\frac{7}{8} \\ -\ 7 \\ \hline \end{array}$$

$$\begin{array}{r} 45\frac{1}{2} \\ -20 \\ \hline \end{array}$$

$43\frac{19}{27}$

$11\frac{74}{103}$

$$\begin{array}{r} 97\frac{19}{27} \\ -\ 54 \\ \hline \end{array}$$

$$\begin{array}{r} 214\frac{74}{103} \\ -\ 203 \\ \hline \end{array}$$

$29\frac{3}{4}$

$205\frac{3}{7}$

$$\begin{array}{r} 78\frac{3}{4} \\ -\ 49 \\ \hline \end{array}$$

$$\begin{array}{r} 1,463\frac{3}{7} \\ -\ 1,258 \\ \hline \end{array}$$

	$\frac{2}{2} = 1$
1	$\frac{6}{6} =$
1	$\frac{12}{12} =$
1	$\frac{203}{203} =$
	$1 = \frac{3}{3}$
$\frac{4}{4}$	$1 = \frac{}{4}$
$\frac{17}{17}$	$1 = \frac{17}{}$
$\frac{305}{305}$	$1 = \frac{305}{}$
$\frac{8}{8}$	$1 - \frac{3}{8} = ?$
	$1 = \frac{}{8}$
$\frac{5}{8}$	$\frac{8}{8} - \frac{3}{8} = \frac{}{8}$

$\frac{5}{5}$	$1 - \frac{3}{5} = ?$ $1 = \frac{\quad}{5}$
$\frac{2}{5}$	$\frac{5}{5} - \frac{3}{5} = \frac{2}{\quad}$
$\frac{6}{6}$	$\begin{array}{r} 1 \\ -\ \frac{5}{6} \\ \hline ? \end{array}$ $1 = \frac{\quad}{6}$
$\frac{1}{6}$	$\frac{6}{6} - \frac{5}{6} = \frac{\quad}{\quad}$
2	$\begin{array}{r} 2 \\ -\ \frac{1}{4} \\ \hline ? \end{array}$ How many 1's are there in 2 ? _____ Change one of them to $\frac{4}{4}$. $2 = 1\frac{4}{4}$
$1\frac{3}{4}$	$\begin{array}{r} 1\ \frac{4}{4} \\ -\ \frac{1}{4} \\ \hline 1\ \frac{\quad}{4} \end{array}$

$8\frac{5}{7}$	$9 - \frac{2}{7} = ?$ Change the 9 to $8\frac{7}{7}$. $8\frac{7}{7} - \frac{2}{7} = 8\text{—}$
$6\frac{8}{8}$	$7 - \frac{5}{8} = ?$ Change the 7 to $6\frac{}{8}$. $6\frac{8}{8} - \frac{5}{8} = 6\text{—}$
$6\frac{3}{8}$	
$11\frac{9}{9}$	$12 - \frac{2}{9} = ?$ $12 = 11\frac{}{9}$
$11\frac{7}{9}$	$11\frac{9}{9} - \frac{2}{9}$

TEST

$3\ \frac{1}{5}$

$3 + \frac{1}{5} =$

$19\ \frac{3}{4}$

$19 + \frac{3}{4} =$

$8\ \frac{5}{8}$

$16\ \frac{9}{10}$

$$\begin{array}{r} 6 \\ 2 \\ +\ \frac{5}{8} \\ \hline \end{array}$$

$$\begin{array}{r} 7 \\ 5 \\ 4 \\ +\ \frac{9}{10} \\ \hline \end{array}$$

$3\ \frac{1}{6}$

$5\ \frac{4}{7}$

$$\begin{array}{r} 4\ \frac{1}{6} \\ -\ 1 \\ \hline \end{array}$$

$$\begin{array}{r} 18\ \frac{4}{7} \\ -\ 13 \\ \hline \end{array}$$

$\frac{3}{5}$

$\frac{5}{8}$

$1 - \frac{2}{5} =$

$1 - \frac{3}{8} =$

$3\ \frac{2}{3}$

$14\ \frac{7}{9}$

$$\begin{array}{r} 4 \\ -\ \frac{1}{3} \\ \hline \end{array}$$

$$\begin{array}{r} 15 \\ -\ \frac{2}{9} \\ \hline \end{array}$$

$$40\ \frac{13}{13}$$

$$\begin{array}{r} 41 \\ -\ \frac{5}{13} \\ \hline \end{array}$$

$$?$$

$$41 = 40\ \frac{13}{13}$$

$$40\ \frac{8}{13}$$

$$\begin{array}{r} 40\ \frac{13}{13} \\ -\ \frac{5}{13} \\ \hline \end{array}$$

$$\begin{array}{r} 51\ \frac{6}{6} \\ -\ \frac{5}{6} \\ \hline 51\ \frac{1}{6} \end{array}$$

$$\begin{array}{r} 52 \\ -\ \frac{5}{6} \\ \hline \end{array}$$

$$?$$

$$\begin{array}{r} 113 \\ -\ \frac{4}{11} \\ \hline \end{array}$$

$$?$$

$$\begin{array}{r} 112\ \frac{11}{11} \\ -\ \frac{4}{11} \\ \hline 112\ \frac{7}{11} \end{array}$$

$$\begin{array}{r} 17\ \frac{4}{4} \\ -\ \frac{3}{4} \\ \hline 17\ \frac{1}{4} \end{array}$$

$$\begin{array}{r} 18 \\ -\ \frac{3}{4} \\ \hline \end{array}$$

$$?$$

$$\begin{array}{r} 73 \\ -\ \frac{7}{9} \\ \hline \end{array}$$

$$?$$

$$\begin{array}{r} 72\ \frac{9}{9} \\ -\ \frac{7}{9} \\ \hline 72\ \frac{2}{9} \end{array}$$

$7\frac{3}{14}$	$\begin{array}{r} 9 \\ -\ 1\frac{11}{14} \\ \hline ? \end{array}$	⟶	$\begin{array}{r} 8\frac{14}{14} \\ -\ 1\frac{11}{14} \\ \hline 7\frac{}{14} \end{array}$
$100\frac{5}{9}$	$\begin{array}{r} 110\frac{3}{9} \\ -\ 9\frac{7}{9} \\ \hline ? \end{array}$	⟶	$\begin{array}{r} 109\frac{12}{9} \\ -\ 9\frac{7}{9} \\ \hline 100 — \end{array}$
$\begin{array}{r} 24\frac{10}{8}\ \left(\frac{2}{8}+\frac{8}{8}\right) \\ -\ 15\frac{7}{8} \\ \hline 9\frac{3}{8} \end{array}$	$\begin{array}{r} 25\frac{2}{8} \\ -\ 15\frac{7}{8} \\ \hline ? \end{array}$	⟶	
$\begin{array}{r} 96\frac{5}{5} \\ -\ 4\frac{4}{5} \\ \hline 92\frac{1}{5} \end{array}$	$\begin{array}{r} 97 \\ -\ 4\frac{4}{5} \\ \hline ? \end{array}$	⟶	
$\begin{array}{r} 87\frac{9}{9} \\ -\ 43\frac{2}{9} \\ \hline 44\frac{7}{9} \end{array}$	$\begin{array}{r} 88 \\ -\ 43\frac{2}{9} \\ \hline ? \end{array}$	⟶	
$\begin{array}{r} 246\frac{12}{11}\ \left(\frac{1}{11}+\frac{11}{11}\right) \\ -\ 113\frac{4}{11} \\ \hline 133\frac{8}{11} \end{array}$	$\begin{array}{r} 247\frac{1}{11} \\ -\ 113\frac{4}{11} \\ \hline ? \end{array}$	⟶	

$\frac{3}{8}$	$1 - \frac{5}{8}$	$3 - \frac{5}{9}$
$2\ \frac{4}{9}$		
$5\ \frac{1}{3}$	$6 - \frac{2}{3}$	$11 - \frac{5}{7}$
$10\ \frac{2}{7}$		
$16\ \frac{1}{9}$	$17 - \frac{8}{9}$	$26 - \frac{1}{4}$
$25\ \frac{3}{4}$		
$35\ \frac{2}{5}$	$39 - 3\ \frac{3}{5}$	$154\ \frac{2}{14} - 2\ \frac{5}{14}$
$151\ \frac{11}{14}$		
$367\ \frac{5}{9}$	$689 - 321\ \frac{4}{9}$	$1,321\ \frac{5}{11} - 200\ \frac{6}{11}$
$1,120\ \frac{10}{11}$		

Any mixed number may be changed to an improper fraction.

$$2\frac{1}{3} = ?$$

6

Multiply the whole number by the denominator of the fraction:

$$3 \times 2 = ____$$

7

Add the numerator of the fraction to this answer:

$$6 + 1 = ____$$

This is the new numerator. The denominator stays the same:

$$2\frac{1}{3} = \frac{7}{3}$$

12

$$3\frac{1}{4} = ?$$

$$4 \times 3 = ____$$

13

$$12 + 1 = ____$$

So $$3\frac{1}{4} = \frac{13}{4}$$

8

$$2\frac{3}{4} = ?$$

11

$$4 \times 2 = ____$$

$$8 + 3 = ____$$

$\frac{11}{4}$

So $$2\frac{3}{4} = \frac{11}{4}$$

an improper

We can change a mixed number to { a proper / an improper } fraction.

4	$4\frac{2}{3} = ?$
2	$3 \times ___ = 12$
$\frac{14}{3}$	$12 + ___ = 14$
	So $4\frac{2}{3} = \frac{__}{3}$
5	$3\frac{4}{5} = ?$
15	$___ \times 3 = 15$
$\frac{19}{5}$	$___ + 4 = 19$
	So $3\frac{4}{5} = \frac{19}{__}$
$6 \times 4 = 24$	$4\frac{5}{6} = ?$
29	$6 \times ___ = ___$
$\frac{29}{6}$	$24 + 5 = ___$
	So $4\frac{5}{6} = \frac{__}{__}$

$\frac{5}{2}$	TEST
$\frac{4}{3}$	$2\frac{1}{2} = \frac{5}{\quad}$ $\quad$ $1\frac{1}{3} = \frac{4}{\quad}$
$\frac{7}{2}$	$3\frac{1}{2} = \frac{\quad}{2}$ $\quad$ $2\frac{2}{5} = \frac{\quad}{5}$
$\frac{12}{5}$	
$\frac{30}{7}$	$4\frac{2}{7} = \frac{30}{\quad}$ $\quad$ $3\frac{3}{4} = \frac{\quad}{4}$
$\frac{15}{4}$	
$\frac{17}{6}$	$2\frac{5}{6} = \frac{\quad}{6}$ $\quad$ $1\frac{7}{8} = \frac{15}{\quad}$
$\frac{15}{8}$	
$\frac{14}{5}$	$2\frac{4}{5} = \underline{\quad\quad}$ $\quad$ $6\frac{1}{3} = \underline{\quad\quad}$
$\frac{19}{3}$	

$\frac{7}{3}$

$\frac{3}{2}$

$\frac{7}{2}$

$3\frac{1}{2}$

$\frac{10}{3}$

$\frac{9}{4}$

$\frac{15}{2}$

$7\frac{1}{2}$

$$2\frac{1}{3} \times 1\frac{1}{2} = ?$$

First change the mixed numbers to improper fractions.

$$2\frac{1}{3} = \text{——}$$

$$1\frac{1}{2} = \text{——}$$

Multiply:

$$\frac{7}{\cancel{3}_{1}} \times \frac{\overset{1}{\cancel{3}}}{2} = \text{——}$$

Change $\frac{7}{2}$ to a mixed number.

$$\frac{7}{2} = 3\frac{1}{}$$

$$3\frac{1}{3} \times 2\frac{1}{4} = ?$$

$$3\frac{1}{3} = \text{——}$$

$$2\frac{1}{4} = \text{——}$$

So $\frac{\overset{5}{\cancel{10}}}{\cancel{3}_{1}} \times \frac{\overset{3}{\cancel{9}}}{\cancel{4}_{2}} = \frac{15}{}$

$$\frac{15}{2} =$$

$$\frac{8}{5}$$

$$\frac{9}{2}$$

$$\frac{8}{5} \times \frac{9}{2} = \frac{36}{5}$$

$$7\frac{1}{5}$$

$$1\frac{3}{5} \times 4\frac{1}{2} = ?$$

$$1\frac{3}{5} =$$

$$4\frac{1}{2} =$$

$$\frac{8}{5} \times \frac{9}{2} =$$

$$\frac{36}{5} =$$

$$\frac{8}{3}$$

$$\frac{13}{4}$$

$$\frac{8}{3} \times \frac{13}{4} = \frac{26}{3}$$

$$8\frac{2}{3}$$

$$2\frac{2}{3} \times 3\frac{1}{4} = ?$$

$$2\frac{2}{3} =$$

$$3\frac{1}{4} =$$

$$\frac{8}{3} \times \frac{13}{4} =$$

$$\frac{26}{3} =$$

$$\frac{15}{4} \times \frac{11}{5} = \frac{33}{4}$$

$$8\frac{1}{4}$$

$$3\frac{3}{4} \times 2\frac{1}{5} = ?$$

$$\downarrow \qquad \downarrow$$

$$\frac{15}{4} \times \frac{11}{5} =$$

$$\frac{33}{4} =$$

$\frac{\cancel{13}^{1}}{\cancel{2}_{1}} \times \frac{\cancel{3}^{3}}{\cancel{2}} = \frac{39}{2} = 19\frac{1}{2}$

$4\frac{1}{3} \times 4\frac{1}{2} = ?$ $5\frac{1}{4} \times 1\frac{2}{7} = ?$

$\frac{\cancel{21}^{3}}{4} \times \frac{9}{\cancel{7}_{1}} = \frac{27}{4} = 6\frac{3}{4}$

$\frac{7}{4} \times \frac{5}{2} = \frac{35}{8} = 4\frac{3}{8}$

$1\frac{3}{4} \times 2\frac{1}{2} = ?$ $2\frac{1}{7} \times 1\frac{3}{4} = ?$

$\frac{\cancel{15}^{1}}{\cancel{7}_{1}} \times \frac{\cancel{7}^{1}}{4} = \frac{15}{4} = 3\frac{3}{4}$

$\frac{\cancel{24}^{3}}{7} \times \frac{\cancel{13}^{1}}{\cancel{8}_{1}} = \frac{39}{7} = 5\frac{4}{7}$

$3\frac{3}{7} \times 1\frac{5}{8} = ?$ $2\frac{1}{3} \times 1\frac{1}{5} = ?$

$\frac{7}{\cancel{3}_{1}} \times \frac{\cancel{6}^{2}}{5} = \frac{14}{5} = 2\frac{4}{5}$

$\frac{\cancel{5}^{1}}{\cancel{2}_{1}} \times \frac{\cancel{11}^{11}}{\cancel{10}_{2}} = \frac{11}{4} = 2\frac{3}{4}$

$2\frac{1}{2} \times 1\frac{1}{10} = ?$ $2\frac{1}{5} \times 3\frac{1}{3} = ?$

$\frac{11}{\cancel{5}_{1}} \times \frac{\cancel{10}^{2}}{3} = \frac{22}{3} = 7\frac{1}{3}$

$\frac{7}{\cancel{2}_{1}} \times \frac{\cancel{10}^{5}}{3} = \frac{35}{3} = 11\frac{2}{3}$

$3\frac{1}{2} \times 3\frac{1}{3} = ?$ $2\frac{5}{7} \times 2\frac{4}{5} = ?$

$\frac{19}{\cancel{7}_{1}} \times \frac{\cancel{14}^{2}}{5} = \frac{38}{5} = 7\frac{3}{5}$

$\frac{11}{4}$

$\frac{5}{4}$

$\frac{4}{5}$

$\frac{11}{5}$

$2\frac{1}{5}$

$2\frac{3}{4} \div 1\frac{1}{4} = ?$

$2\frac{3}{4} =$

$1\frac{1}{4} =$

$\frac{11}{4} \div \frac{5}{4} = ?$

$\frac{5}{4}$ inverted is $\frac{\quad}{\quad}$.

$\frac{\cancel{11}^{\,1}}{\cancel{4}_{\,1}} \times \frac{\cancel{4}^{\,1}}{5} =$

$\frac{11}{5} =$

$\frac{11}{3}$

$\frac{11}{4}$

$\frac{4}{3}$

$1\frac{1}{3}$

$3\frac{2}{3} \div 2\frac{3}{4} = ?$

$3\frac{2}{3} =$

$2\frac{3}{4} =$

$\frac{11}{3} \div \frac{11}{4} = ?$

$\frac{\cancel{11}^{\,1}}{3} \times \frac{4}{\cancel{11}_{\,1}} =$

$\frac{4}{3} =$

$5\frac{1}{2} \div 1\frac{3}{4} = ?$ $4\frac{4}{5} \div 1\frac{1}{3} = ?$

$\frac{11}{\cancel{2}_{1}} \times \frac{\overset{2}{\cancel{4}}}{7} = \frac{22}{7} = 3\frac{1}{7}$

$\frac{\overset{6}{\cancel{24}}}{5} \times \frac{3}{\cancel{4}_{1}} = \frac{18}{5} = 3\frac{3}{5}$

$4\frac{1}{3} \div 1\frac{1}{3} = ?$ $3\frac{3}{4} \div 2\frac{1}{2} = ?$

$\frac{13}{\cancel{2}_{1}} \times \frac{\overset{1}{\cancel{2}}}{4} = \frac{13}{4} = 3\frac{1}{4}$

$\frac{\overset{3}{\cancel{15}}}{\cancel{4}_{2}} \times \frac{\overset{1}{\cancel{2}}}{\cancel{5}_{1}} = \frac{3}{2} = 1\frac{1}{2}$

$7\frac{1}{2} \div 6\frac{2}{3} = ?$ $4\frac{5}{6} \div 3\frac{1}{3} = ?$

$\frac{\overset{3}{\cancel{15}}}{2} \times \frac{3}{\cancel{28}_{4}} = \frac{9}{8} = 1\frac{1}{8}$

$\frac{29}{\cancel{6}_{2}} \times \frac{\overset{1}{\cancel{3}}}{10} = \frac{29}{20} = 1\frac{9}{20}$

$5\frac{1}{2} \div 1\frac{1}{2} = ?$ $4\frac{3}{4} \div 2\frac{1}{4} = ?$

$\frac{11}{\cancel{2}_{1}} \times \frac{\overset{1}{\cancel{2}}}{3} = \frac{11}{3} = 3\frac{2}{3}$

$\frac{19}{\cancel{4}_{1}} \times \frac{\overset{1}{\cancel{4}}}{9} = \frac{19}{9} = 2\frac{1}{9}$

TEST

$1\frac{5}{6} \times 2\frac{3}{11} = ?$ $5\frac{1}{7} \times 2\frac{1}{6} = ?$

$4\frac{1}{6}$

$11\frac{1}{7}$

$4\frac{1}{4} \times 1\frac{1}{3} = ?$ $3\frac{2}{3} \times 1\frac{1}{5} = ?$

$5\frac{2}{3}$

$4\frac{2}{5}$

$7\frac{1}{2} \times 1\frac{4}{5} = ?$ $6\frac{2}{3} \times 2\frac{1}{5} = ?$

$13\frac{1}{2}$

$14\frac{2}{3}$

$2\frac{1}{8} \div 1\frac{1}{4} = ?$ $6\frac{4}{5} \div 2\frac{1}{5} = ?$

$1\frac{7}{10}$

$3\frac{1}{11}$

$3\frac{3}{8} \div 2\frac{1}{4} = ?$ $5\frac{5}{7} \div 3\frac{1}{5} = ?$

$1\frac{1}{2}$

$1\frac{11}{14}$

3 2	Since $2 \times 3 = 6$, we know that $6 \div 2 =$ ____ and $6 \div 3 =$ ____ 6 is <u>divisible</u> by both 3 and 2.
20	To find the smallest number that is divisible by both 4 and 5, we say $4 \times 5 =$
12	To find the smallest number that is divisible by both 3 and 4, we say $3 \times 4 =$
30	Find the smallest number divisible by both 5 and 6: $5 \times 6 =$
7	Find the smallest number divisible by both 4 and 7: $4 \times$ ____ $= 28$
$7 \times 5 = 35$	Find the smallest number divisible by both 7 and 5: ____ $\times$ ____ $=$ ____

10 21 9 × 4 = 36 5 × 8 = 40 7 × 8 = 56	Find the smallest number divisible by each of the following pairs: 2 and 5 (2 × 5 = _____) 3 and 7 (3 × 7 = _____) 9 and 4 5 and 8 8 and 7
4	Since 4 ÷ 4 = 1, the lowest number divisible by 4 is 4, 12
5	Since 5 ÷ 5 = 1, the lowest number divisible by 5 is 5, 15
17	The lowest number divisible by 17 is _____ .
2 yes 4	4 ÷ 2 = Is 4 divisible by both itself and 2 ? yes / no The lowest number divisible by both 4 and 2 is___.
6 12 15	Find the lowest number divisible by each of the following pairs: 3 and 6 4 and 12 5 and 15

$\frac{5}{8}$

numerators

$\frac{3}{4}$

4

yes

yes

6

When we add or subtract fractions, we must have the same denominator: $\frac{2}{8} + \frac{3}{8} = \frac{\quad}{8}$

We add or subtract only the { numerators. / denominator.

We can't add these fractions as they are.

$$\frac{1}{2} + \frac{1}{4}$$

Can we add these fractions as they are? { yes / no

But we know that $\frac{1}{2} = \frac{2}{4}$.

So $\frac{2}{4} + \frac{1}{4} = \frac{\quad}{4}$

The common denominator we found was { 2. / 4.

To make problems easy to work, we will try to find the lowest common denominator.

This is the lowest number divisible by both denominators.

Is 4 divisible by both 2 and 4? { yes / no

Is 4 the lowest common denominator for the fractions $\frac{3}{4}$ and $\frac{1}{2}$? { yes / no

The lowest common denominator for the fractions $\frac{2}{3}$ and $\frac{1}{6}$ must be { 3. / 6.

20

12

14

15

Find the lowest common denominator (the lowest number divisible by both denominators) for each of the following pairs:

$\frac{1}{6}$ and $\frac{1}{3}$ 6

$\frac{1}{20}$ and $\frac{1}{5}$ ____

$\frac{1}{4}$ and $\frac{1}{12}$ ____

$\frac{1}{7}$ and $\frac{1}{2}$ ____

$\frac{1}{3}$ and $\frac{1}{5}$ ____

divide

When we reduce a fraction, we divide / multiply both terms by the same number.

To raise a fraction to <u>higher terms</u>, we <u>multiply</u> both terms by the same number.

$$\frac{1}{2} = \frac{?}{8}$$

4

We multiplied the denominator 2 by ____ to get the new denominator 8.

We must also multiply the numerator by 4.

$\frac{4}{8}$

$$\frac{1}{2} = \frac{(4 \times 1)}{8}$$

$\frac{2}{6}$ $\frac{8}{20}$	$\frac{1}{3} = \frac{}{6}^{(2 \times 1)}$ $\qquad$ $\frac{2}{5} = \frac{}{20}^{(4 \times 2)}$
$\frac{9}{21}$ $\frac{30}{50}$	$\frac{3}{7} = \frac{}{21}$ $\qquad$ $\frac{6}{10} = \frac{}{50}$
6 $\frac{4}{6}$ $\frac{5}{6}$	$\frac{2}{3} + \frac{1}{6} = ?$ What is the lowest common denominator? _____ Change $\frac{2}{3}$ to higher terms: $\frac{2}{3} = \frac{}{6}$ So $\frac{4}{6} + \frac{1}{6} = \frac{}{6}$
12 $\frac{4}{12}$ $\frac{5}{12}$	$\frac{1}{3} + \frac{1}{12} = ?$ What is the lowest common denominator? _____ $\frac{1}{3} = \frac{}{12}$ $\qquad$ So $\frac{4}{12} + \frac{1}{12} =$ —
16 $\frac{2}{16}$ $\frac{3}{16}$	$\frac{1}{16} + \frac{1}{8} = ?$ What is the lowest common denominator? _____ $\frac{1}{8} = \frac{}{16}$ $\qquad$ $\frac{1}{16} + \frac{2}{16} =$

12	TEST Find the lowest common denominator for each of the following pairs of fractions: $\frac{1}{3}$ and $\frac{1}{4}$ ____ $\frac{1}{2}$ and $\frac{2}{7}$ ____ $\frac{2}{3}$ and $\frac{1}{8}$ ____ $\frac{1}{9}$ and $\frac{1}{3}$ ____ $\frac{2}{5}$ and $\frac{4}{15}$ ____
14	
24	
9	
15	
$\frac{2}{8}$ $\frac{6}{9}$	$\frac{1}{4} = \frac{\quad}{8}$ $\qquad$ $\frac{2}{3} = \frac{\quad}{9}$
15	$\frac{4}{15} + \frac{1}{5} = ?$ What is the lowest common denominator? ____ $\frac{1}{5} = \frac{\quad}{15}$
$\frac{3}{15}$	
$\frac{7}{15}$	$\frac{4}{15} + \frac{3}{15} =$

6	$\frac{1}{2} + \frac{1}{3} = ?$
$\frac{3}{6}$	What is the lowest common denominator? ___
$\frac{2}{6}$	$\frac{1}{2} = \frac{\quad}{6}$
$\frac{5}{6}$	$\frac{1}{3} =$ $\frac{3}{6} + \frac{2}{6} =$
20	$\frac{1}{4} + \frac{3}{5} = ?$
$\frac{5}{20}$	What is the lowest common denominator? ___
$\frac{12}{20}$	$\frac{1}{4} = \frac{\quad}{\quad}$
$\frac{17}{20}$	$\frac{3}{5} = \frac{\quad}{\quad}$ $\frac{5}{20} + \frac{12}{20} =$
$\frac{10}{15}$	$\frac{2}{3} + \frac{1}{5} = ?$
$\frac{3}{15}$	$\frac{2}{3} = \frac{\quad}{\quad}$
$\frac{13}{15}$	$\frac{1}{5} = \frac{\quad}{\quad}$ $\frac{10}{15} + \frac{3}{15} =$
$\frac{9}{18}$	$\frac{1}{2} + \frac{4}{9} = ?$
$\frac{8}{18}$	$\frac{1}{2} = \frac{\quad}{\quad}$
$\frac{17}{18}$	$\frac{4}{9} = \frac{\quad}{\quad}$ $\frac{9}{18} + \frac{8}{18} =$

$\frac{9}{21}$	$\frac{3}{7} + \frac{1}{3} = ?$ $\frac{3}{7} = __$ $\frac{1}{3} = __$ $\frac{9}{21} + __ =$
$\frac{7}{21}$	
$\frac{9}{21} + \frac{7}{21} = \frac{16}{21}$	
$\frac{1}{8} + \frac{6}{8} = \frac{7}{8}$	$\frac{1}{8} + \frac{3}{4} = ?$
40	$\frac{5}{8} - \frac{3}{5} = ?$ What is the lowest common denominator? _____ $\frac{5}{8} = __$ $\frac{3}{5} = __$ $\frac{25}{40} - \frac{24}{40} =$
$\frac{25}{40}$	
$\frac{24}{40}$	
$\frac{1}{40}$	
$\frac{4}{12}$	$\frac{1}{3} - \frac{1}{4} = ?$ $\frac{1}{3} = __$ $\frac{1}{4} = __$ $\frac{4}{12} - __ =$
$\frac{3}{12}$	
$\frac{4}{12} - \frac{3}{12} = \frac{1}{12}$	

$\frac{11}{18} - \frac{4}{18} = \frac{7}{18}$

$\frac{11}{18} - \frac{2}{9} = ?$

$\frac{12}{15} - \frac{10}{15} = \frac{2}{15}$

$\frac{4}{5} - \frac{2}{3} = ?$

$\frac{9}{6}$

$\frac{14}{6}$

$\frac{7}{3}$

$2\frac{1}{3}$

$1\frac{1}{2} + \frac{5}{6} = ?$

$1\frac{1}{2} = \frac{3}{2}$

$\frac{3}{2} = \frac{\quad}{6}$

$\frac{9}{6} + \frac{5}{6} =$

Reduce to lowest terms: $\frac{14}{6} = \frac{\quad}{3}$

$\frac{7}{3} = __ \frac{1}{3}$

$\frac{22}{8} + \frac{5}{8} = \frac{27}{8}$

$\frac{27}{8} = 3\frac{3}{8}$

$2\frac{3}{4} + \frac{5}{8} = ? \quad \left(\frac{11}{4} + \frac{5}{8} = ?\right)$

$\frac{4}{3}$

$\frac{16}{12}$

$\frac{11}{12}$

$1\frac{1}{3} - \frac{5}{12} = ?$

$1\frac{1}{3} = \frac{\quad}{3}$

$\frac{4}{3} = \frac{\quad}{12}$

$\frac{16}{12} - \frac{5}{12} =$

$2\frac{1}{2} = \frac{5}{2}$

$\frac{5}{2} = \frac{25}{10}$

$\frac{25}{10} - \frac{8}{10} = \frac{17}{10}$

$\frac{17}{10} = 1\frac{7}{10}$

$2\frac{1}{2} - \frac{4}{5} = ?$

$\frac{6}{24}$

$\frac{4}{24}$

$\frac{5}{12}$

We can always find a common denominator by multiplying the denominators. If this isn't the <u>lowest</u> common denominator, we will need to reduce our answer to lowest terms.

$$\frac{1}{4} + \frac{1}{6} = ?$$

The lowest common denominator is 12, but let's suppose we multiplied 4×6 and used 24 as our common denominator:

$$\frac{1}{4} = \frac{\quad}{24}$$

$$\frac{1}{6} = \frac{\quad}{24}$$

$$\frac{6}{24} + \frac{4}{24} = \frac{10}{24} = \frac{\quad}{12}$$

$\frac{8}{48}$

$\frac{30}{48}$

$\frac{38}{48} = \frac{19}{24}$

$\frac{1}{6} + \frac{5}{8} = ?$ The lowest common denominator is 24, but let's use 48 (8 × 6).

$\frac{1}{6} = \frac{\quad}{48}$

$\frac{5}{8} = \frac{\quad}{48}$

$\frac{8}{48} + \frac{30}{48} = \frac{\quad}{\quad} = \frac{\quad}{\quad}$

$\frac{3}{4} = \frac{30}{40}$

$\frac{3}{10} = \frac{12}{40}$

$\frac{30}{40} - \frac{12}{40} = \frac{18}{40}$

$\frac{18}{40} = \frac{9}{20}$

$\frac{3}{4} - \frac{3}{10} = ?$ Use 40 as the common denominator (instead of the lowest common denominator 20).

FINAL EXAM - Side 2

$5\frac{6}{19} + 3\frac{7}{19}$

$25\frac{8}{15} + 6\frac{3}{15}$

$21\frac{6}{7} - 17\frac{2}{7}$

Change to mixed numbers:

$\frac{7}{4} =$

$\frac{13}{3} =$

$\frac{19}{4} =$

$8 \times \frac{7}{12} =$

$\frac{3}{7} \times 28 =$

$9 \div \frac{3}{5} = ?$

$\frac{4}{9} \div 8 = ?$

$$\begin{array}{r} 13 \\ -\ 5\frac{5}{7} \\ \hline \end{array}$$

$$\begin{array}{r} 173 \\ -\ 2\frac{4}{13} \\ \hline \end{array}$$

Change to improper fractions:

$2\frac{5}{9} =$

$4\frac{3}{5} =$

$1\frac{1}{3} \times 2\frac{1}{2} = ?$

$4\frac{1}{8} \div 2\frac{1}{4} = ?$

$\frac{2}{5} + \frac{4}{7} = ?$

$\frac{5}{6} - \frac{2}{5} = ?$

$1\frac{1}{2} + \frac{2}{3} = ?$

$2\frac{1}{4} - \frac{7}{8} = ?$

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